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ABSTRACT

This report discusses the results of a New Jersey school study to analyze trends in staff ratios during the past three years. The study also measured the effects of grade organization type, community type, enrollment size, and district wealth on staffing ratios for 582 local districts in the state. The report begins with a literature review of staffing practices and educational outcomes. The methodology used, described in detail, included collection and analysis of data files from the New Jersey Department of Education. One chapter is devoted to guidelines for school staffing ratios, borrowed from recommended or mandated ratios from other states and from professional educational organizations. The major conclusion of this report is that the current staff ratios appear to be unacceptable in terms of a local district's ability to provide both a thorough and efficient system of education.
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A Study of New Jersey
Staffing Practices

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A Report to the State Board of Education

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I. INTRODUCTION

Since the beginning of public education, educators and the public alike have sought to specify how much financial support is needed to assure adequate educational processes. This question was most frequently considered in terms of salaries and number of staff representing the highest cost item. Historically, students of educational governance have centered their concern on cost-benefits, while the issue of staffing impact on student achievement has generally been the concern of those interested in teaching and learning. This was not a practical dichotomy; each viewpoint should influence and mutually improve the other.

Major changes in staff-pupil ratios have been attributed to collective bargaining, federal and state mandates, school district consolidation and improved educational technology. Studies on staffing and student achievement have not been conclusive in this area and the research to date has largely been contradictory.

Since 1975, with the passage of the T & E legislation and a substantial increase in state aid to local districts, the interest in educational cost-benefit has increased in both the legislative and the executive branches of state government.

Concern over staffing practices in New Jersey schools peaked in the Fall of 1978, and Commissioner Fred G. Burke

directed staff to consider staffing patterns with respect to T & E mandates and potential school budgetary problems. The Commissioner, prompted by a concern for inflationary factors affecting the access to, and delivery of, quality instructional and support services to children, identified the need to provide a data base on staffing patterns in local districts. A plan was developed and staff began to explore the possibility of generating the needed descriptive data.

Subsequent to this activity, a February 1979 letter from Governor Brendan T. Byrne to Mr. P. Paul Ricci, President of the State Board of Education, questioned whether local school districts had excessive numbers of administrators and other certificated and non-certificated personnel. Citing the public demand for fiscal accountability and the need for appropriate budget practices by local districts, the Governor charged the State Board of Education to address these and other issues in their report on the evaluation of the Public School Education Act of 1975.

Simultaneously, local districts were experiencing significant increases in insurance and energy related costs. The Commissioner recognized that budget constraints, including these and other economic and inflationary factors, might begin to erode the instructional program. Additionally, local administrators and board members also expressed their concern to the Commissioner. Consequently, during the summer of 1979

a study was undertaken to provide the necessary data base to examine this problem.

During the four years since the advent of the T & E law, declining enrollment affected the majority of New Jersey school districts, particularly at the elementary level. This, coupled with new federal and state program mandates, necessarily caused shifts in staffing patterns. Correspondingly, reductions in the state aid to local districts, inflation and budget caps further caused districts to examine carefully their budgets and administrative practices for potential cost savings and redeployment of ever-shrinking resources. With staffing costs dominating major budget appropriations, staffing attracted more district concern.

This report represents an initial step in addressing the following concerns:

1. What are the staffing patterns in New Jersey school districts?
2. Is there excessive staffing in New Jersey public schools?
3. How are external factors, such as district grade organization, enrollment, wealth, community type and socio-economic level, related to staffing patterns?
4. What relationship is there between staffing patterns and pupil achievement?
5. Are there levels at which staffing patterns are

optimal or dysfunctional in terms of maximum cost efficiency and optimal pupil achievement?

To answer these and other related research questions, the department developed a study to analyze trends over the previous three years in staff ratios and the effects of district grade organization, enrollment size, district wealth and community types over the past school year on staffing ratios for 582 local districts in the state. This report presents the results of this study and serves as the first phase of a department research effort on the impact of staff ratios on educational outcomes and local districts' expenditures. The report includes a brief research review on staffing practices and educational outcomes; the procedures, design and findings of this study; conclusions and recommendations; research references and appendices.

A. Definitions

Terms used throughout this study are defined below:

Administrative Personnel are the line administrators in a school district. This category typically includes the superintendent, assistant superintendent, principal, assistant principal, school business administrator. The complete list of titles comprising this category appears in Appendix A. The terms administrators, administrative staff and administrative personnel are used interchangeably.

Certificated Staff are teaching staff members required by statute to hold a certificate issued by the State Board of Examiners.

District Complexity Factors are those characteristics that identify an individual school district, such as enrollment size, district wealth, community type, district grade organization, enrollment fluctuations, number and age of facilities, geographic considerations, special or unique student populations, socio-economic status of the student population.

Educational Services Personnel are certificated professional support staff, such as the director of guidance, counselors, media specialists, school psychologists and learning-disabilities teachers-consultants. A complete list of job titles in this category is provided in Appendix A.

Instructional Personnel are classroom teachers. The terms instructional staff, instructors and teachers are used interchangeably. Appendix A provides a complete list of certificated instructional job titles.

Non-Certificated Staff are food services personnel, operation of plant personnel, maintenance personnel, transportation personnel and instructional aides.

Regional Districts are receiving districts that are legally constituted as K-12, 7-12 or 9-12 regional. Consolidated districts are also included as regional school districts.

Students are the pupils at or between the legal ages of compulsory school attendance. The terms pupils and students are used interchangeably.

Supervisors and Coordinators serve as full-time or part-time department chairpersons, area coordinators, directors or

supervisors, such as supervisor of elementary education, director of curriculum and instruction, or a subject chairperson. (See Appendix A for a complete list of job titles in this category)

Teaching Staff Members are all teachers, principals, assistant principals, vice principals, superintendents, assistant superintendents, school nurses and other employees in positions requiring appropriate certificates issued by the State Board of Examiners.

B. Limitations of the Study

The report does not specify a preferred set of ratio ranges for each category or position. However, data identifying districts at the high and low extremes for each ratio category were generated.

The following factors limit the comprehensiveness of this report and need to be recognized by the reviewer:

1. Data from the Office of Management Information's Fall Report were used in this study. Changes in staffing and enrollment at the districts level occurring over the course of the school year are not reflected.
2. Positions were grouped by job title into categories using a Delphi technique (see Appendix A for job title categories). However, this does not always ensure that the staff comprising a particular category have comparable responsibilities and workloads.

3. Individual positions such as the school nurse, guidance counselors and others were not treated separately but were included in the aggregate for educational services personnel.
4. Teacher-pupil ratios represent the aggregate number of regular classroom teaching positions to the total student enrollment. Class size references mean average district class size rather than the number of pupils per teacher in a specific classroom setting.
5. A series of factors, including the timeframe of the study, timelines for completion, the reliability of the data submitted by local districts on the Fall Report, and the limited accessibility of certain data elements, precluded a more definite analysis at this time.

II. LITERATURE REVIEW

This review summarizes recommended staffing practices. The staff ratios and formulas presented were developed by other states, local districts, professional organizations, and educational researchers for specific educational settings and encompass only recommendations for full-time staff positions.

Key to the optimum use of educational staff is a comprehensive understanding of district goals, objectives and identified learner needs. As a district develops an educational program and deploys staff according to these goals, objectives and needs, other considerations complicate these educational processes. Richard Wynn suggests the following list of variables which, in part, constitute the relative level of a district's complexity. These factors need to be examined when reviewing a particular set of staffing ratios:

1. The size of the school system.
2. The size, number and location of schools in the system.
3. The wealth of the community.
4. The purposes of the school system.
5. The administrative and supervisory services needed to support these purposes.
6. The pattern of organization of the staff.
7. The capabilities and abilities of individual staff members.

8. The demands placed upon staff by the public and/or the board.¹

To make Wynn's complexity factors more contemporary and germane to New Jersey, the following variables can be added: the relative socio-economic status of students in the district and possible budget limitations not accounted for in the district wealth categorization; population mobility; and the relative rate of enrollment change.

The first set of recommended ratios to be discussed is the District-Wide Ratios of Total Professional Staff to Students. Professional staff is defined as the certificated personnel employed by a district at the school and central office levels.

In an analysis of staffing patterns in 132 high expenditure districts in 33 states, Swanson indicated a mean ratio of 48:1 professional staff to 1,000 pupils or 1 professional staff member to 20.8 pupils.²

Firman, working in conjunction with the Quality Measurement Project School Systems in New York State, found that systems

¹Wynn, Richard. Guides to the Solution of Administrative Staffing Problems (With Emphasis on Educational Adequacy and Salary Scheduling). Danville, Illinois: Interstate Printers and Publishers, Inc., July 1958. p. 5.

²Swanson Austin D. Effective Administrative Strategy: An Analysis of Several Aspects of Staff Recruitment and Deployment Study No. 13. New York, New York: Institute of Administrative Research, Teachers College, Columbia University, 1961. p. 22.

that were rated excellent had a mean ratio of 53.2 professional staff per 1,000 students or 1 professional staff member to 18.8 students.³

In analyzing the staffing patterns of the Associated Public School Systems schools of high quality, McKenna found a mean ratio of 68 professional staff per 1,000 students or 1 professional to 14.7 students.⁴

At the state level, the Texas Governor's Committee recommended a ratio of 51.7 professional staff per 1,000 pupils in average daily attendance or 1 professional to 19.3 pupils in ADA.⁵

The Association for Supervision and Curriculum Development recommends an optimum ratio of 60 to 70 professional staff per 1,000 students or 1 professional to 14.3 to 16.7 students, including a 1 to 25 classroom teacher-to-pupil ratio.⁶ A resolution by the National Education Association called for a minimum

³Firman, William D. "The Relationship of Cost to Quality in Education," Long-Range Planning in School Finance. Proceedings of the Sixth National Conference on School Finance. Washington, D.C.: National Education Association, Committee on Educational Finance, 1963. p. 107.

⁴McKenna, Bernard. Staffing the Schools. New York, New York: Bureau of Publications, Teachers College, Columbia University, 1965. p. 80.

⁵Texas Governor's Committee on Public School Education. To Make Texas a National Leader in Public Education: The Challenge and the Charge. Leon Jaworski, Chairman, Austin, Texas: the Committee, August 1968. p. 20.

⁶Educational Research Service. Guidelines for School Staffing Ratios. Arlington, Virginia, 1974. p. 4.

ratio of 50 professional staff per 1,000 pupils or 1 professional to 20 students.⁷

The most current data on trends in staffing patterns developed in a national sample by the Educational Research Service indicated the following: a mean number of 63.7 professional staff per 1,000 students or 1 professional to 15.7 students in small districts (300 to 2,499 pupils); a mean number of 57.1 professional staff per 1,000 students or 1 professional to 17.5 students in medium systems (10,000 to 24,999); and an overall mean of 59.2 professional staff per 1,000 pupils or 1 professional to 16.9 students.⁸

The second set of ratios to be discussed is District-Wide Ratios for Administrators. In these examples, the term administrator means an assistant superintendent, principal, assistant principal, director, coordinator, supervisor, or other certificated administrative staff.

Castetter, Griffiths, and Felker recommend a ratio of three administrators per 1,000 pupils or 1 administrator to 333 pupils.⁹ A later analysis by Phelps suggests a ratio of

⁷Ibid., p. 4.

⁸Educational Research Service, Inc. School Staffing Ratios: Update 1978-79, ERS Research Memo, Arlington, Virginia: 1979. p. 1.

⁹Castetter, William B., William E. Griffiths, and Donald S. Felker Staffing Pennsylvania's Reorganized School Districts: A Study of Size and Composition. Danville, Illinois: Interstate Printers and Publishers, Inc., 1964.

1 administrator per 250 pupils or 10 teachers.¹⁰

The following ratios developed by Wynn are recommended minimums for full-time administrators and supervisors to students in average daily membership:¹¹

5-7:	1000-1200	ADM
6-8:	1200-1400	ADM
7-9:	1400-1600	ADM
8-10:	1600-1800	ADM
9-11:	1800-2000	ADM
9-12:	2000-2200	ADM
10-13:	2200-2400	ADM
11-14:	2400-2600	ADM
12-15:	2600-2800	ADM
13-16:	2800-3000	ADM
14-18:	3000-3500	ADM
16-22:	3500-4000	ADM
18-25:	4000-5000	ADM

At the state level, administrator to teacher ratios are specified in California's Education Code as: nine administrators per 100 teachers in elementary school districts; eight administrators per 100 teachers in K-12 districts; and seven administrators per 100 teachers in high school districts.¹²

The Tennessee State Department of Education requires the following ratios for systemwide administrators to teachers:¹³

- 1 to 30-49 teachers
- 2 to 50-199 teachers
- 3 to 200-399 teachers
- +one additional administrator for each 199 additional teaching positions up to 2,000;
- +one for every 300 teachers thereafter

¹⁰Phelps, H. Vaughn. "Administrative Staff for Comprehensive Educational Services," Planning for School District Organization: Briefs of Position Papers. Lincoln, Nebraska: Great Plains School District Organization Project (411 S. 13th St., 68508), May 1968. pp. 133-134.

¹¹Wynn, op. cit., p. 8.

¹²Educational Research Service. Guidelines for School Staffing Ratios, op. cit., p. 5.

¹³Ibid., p. 5.

The third set of recommended ratios is School Building Level Professional Staff to Students.

At the junior high school, Conant suggests 50 professional staff per 1,000 students as a minimum, or 1 professional to 20 students. Conant recommends a preferred ratio of 59 professional staff per 1,000 students or 1 professional to 169 students. At the senior high school level, Conant recommends a ratio of 52 professional staff to 1,000 pupils or 1 professional to 19.2 pupils.¹⁴

A study of 30 innovative schools by McLure and Pence found the following average staff ratios:¹⁵

	ELEMENTARY SCHOOLS	MIDDLE SCHOOLS	HIGH SCHOOLS
Pupils per teacher	25.4 to 1	22.8 to 1	22.1 to 1
Pupils per non-teaching administrator	317 to 1	169 to 1	182 to 1
Teachers per non-teaching administrator	12.5 to 1	7.4 to 1	8.2 to 1

The Illinois Task Force on Education recommends a ratio of 60 professional staff to 1,000 pupils or 1 professional to 16.7 pupils in large secondary schools (over 1,500 pupils). In smaller secondary schools, the ratio should increase inversely to 80 professional staff to 1,000 pupils or 1 professional to 12.5

¹⁴Conant, James B. A Memorandum to School Boards: Recommendations for Education in the Junior High School Years. Princeton, New Jersey: Educational Testing Service, 1960. p. 34-35.

¹⁵McLure, William P., and Audra May Pence. Early Childhood and Basic Elementary and Secondary Education: Needs, Programs, Demands, Costs. National Educational Finance Project, Special Study No. 1. Champaign, Illinois: Bureau of Educational Research, College of Education, University of Illinois, 1970. p. 78.

pupils.¹⁶

Invariably the educational staff ratio that has been researched most extensively is the pupil to teacher ratio. The first discussion that follows will focus on recommended pupil to teacher ratios at the district level. The conclusion of this discussion will center on the issue of pupil to teacher ratios at the individual class level vis-a-vis student achievement. It is important to note that at the district level, the pupil to teacher ratio is reported as an average ratio or proxy class size measure and not an actual indicator of class size. Hypothetically, for example, a district has two classes and two teachers. One class has ten students while the other class has 30 students. Although these differences in class size represent a wide variation and may have an impact on pupil achievement, district data analyzed at the aggregate level would indicate a pupil to teacher ratio of 20 pupils to 1 teacher.

Castetter, Griffiths, and Felker recommended a district-wide teacher to pupil ratio of 40 teachers per 1,000 students or 1 teacher to 25 students.¹⁷ McKenna suggests a preferred ratio of one teacher to 20 students.¹⁸

Several states have set the following ratios as maximums

¹⁶Illinois Task Force on Education. Education for the Future of Illinois: Report of a Study. William P. McLure, Chairman. Springfield, Illinois: State of Illinois, December 1966, p. 35.

¹⁷Castetter, Griffiths, and Felker, op. cit., p. 30.

¹⁸McKenna, op. cit., p. 50.

for teachers to students: Georgia 1 to 30; Kentucky 1 to 27
ADA; New Mexico accreditation standard 1 to 25; Virginia
1 to 25.¹⁹

A 1963 resolution by the Association for Supervision
and Curriculum Development and a 1967 resolution by the National
Education Association both call for a teacher to pupil ratio of
one teacher per 25 pupils.²⁰

The most recent data from a national study on teacher to
pupil ratios indicates the following: 1 teacher to 18.1 pupils
in small school systems (300-2,499 pupils); 1 teacher to 20.9
pupils in medium school systems (10,000 to 24,999 pupils); and
an overall ratio of 1 teacher to 19.9 pupils in all reporting
systems.²¹

Research on class size and student achievement is repre-
sented by conflicting views, contradictory conclusions, and in
essence, a weak foundation for the purposes of formulating major
state educational policy. Most studies on class size and pupil
achievement are either flawed in terms of research design or
fail to account for all of the different interacting variables
affecting student performance.

A nationwide study by James Coleman on equality of educa-
tional opportunity stirred controversy over the relationship
between class size and student achievement.

¹⁹Educational Research Service, Guidelines for School
Staffing Ratios, op. cit., p. 46.

²⁰Ibid., p. 46.

²¹Educational Research Service, Inc., School Staffing
Ratios: Update 1978-79, ERS Research Memo, op. cit., p. 1.

Some facilities measures, such as pupil/teacher ratio in instruction, are not included because they showed a consistent lack of relation to achievement among all groups under all conditions.²²

Commenting on the controversy surrounding the Coleman Report, Rossi offers the following consideration:

Another example of the power of wishful thinking has to do with the relationship between class size and learning. It is an article of faith among educators that the smaller the class per teacher, the greater the learning experience. Research on this question goes back to the very beginnings of empirical research in educational social science in the early 1920's. There has scarcely been a year since without several dissertations and theses on this topic, as well as larger research by mature scholars - over 200 of them. The latest was done by James Coleman in his nationwide study for the Office of Education under the Civil Rights Act of 1964. Results? By and large, class size has no effect on learning by students, with the possible exception of the language arts.²³

With regard to the Coleman Report, Jencks offers similar conclusions:

There is no evidence that cutting class size would narrow the gap between disadvantaged and advantaged pupils. On the contrary, the shaky evidence of the EEOS (Equality of Educational Opportunity Study) suggests that a general reduction in class size might even widen the gap. I conclude that while reductions in class size can often be justified in terms of teacher's

²²Coleman, James, S., et al. Equality of Educational Opportunity. Washington, D. C.: U.S. Department of Health, Education, and Welfare, Office of Education, 1966.

²³Rossi, Peter H., "Evaluating Educational Programs," in F. G. Caro, Readings in Evaluation Research. New York: Russell Sage Foundation, 1971a, pp. 97-99.

sanity, pleasant classroom atmosphere, and other advantages, they are hard to quantify in terms of test scores.²⁴

Prior to the Coleman Report, a comprehensive review of the research on the relationship between class size and pupil achievement was conducted by Holland and Galfo. Their conclusions follow:

No matter how the research is divided for analytical purposes--by grade level, subject, experimental design, or historically--the results are not consistent. Some projects found in favor of large classes; some found for small. One must conclude that either the designs were uniformly invalid or else there were factors operating to produce the learning results which worked over and above the pupil-teacher ratio.²⁵

Subsequently, Furno and Collins conducted one of the most extensive and impressive studies on class size to date. Their sample charted the achievement path of 16,449 third graders longitudinally for a five-year period employing four different class size levels. They concluded that the students in the smaller classes made significantly greater gains in both reading and math achievement than their counterparts in larger classes over the five-year study period. Further, the gains for non-white students in smaller classes were even greater and showed a positive relationship in 66% of the achievement comparisons as opposed to only 3% favoring achievement gains for non-whites in larger classes.

²⁴Jencks, Christopher S., "The Coleman Report and the Conventional Wisdom," in Frederick Mosteller and Daniel P. Moynihan, (eds.), On Equality of Educational Opportunity. New York: Random House, 1972.

²⁵Holland, Howard K., and Galfo, Armand J., An Analysis of Research Concerning Class Size. Research Contribution to Educational Planning No. 11. Richmond, Virginia: State Department of Education, Division of Educational Research, November 1964.

The conclusions are questionable in the Furno and Collins study since the sample was drawn from one particular urban setting and the groupings for small and large classes were defined as follows: small classes - 25 students or less; large classes - 26 students or more.²⁶

A more recent study by Glass and Smith employs the "meta-analysis" technique. Their findings indicate that student achievement increases substantially when class size is reduced below 20 students in comparison to achievement gains when classes are reduced from 30 to 20 students.²⁷ This study is comprehensive in that over 80 research studies were analyzed based on the researchers' criteria of what comprised an acceptable research design and methodology.

Unfortunately, the research does not reveal any "optimum pupil/teacher ratio." Individual teacher style and instructional technique appear to be more important factors in affecting student achievement than changes in class size.

An era of declining enrollment and increased teacher contract negotiations has produced smaller classes throughout most districts in the state. However, if teachers do not gear their instructional techniques and individual curriculum delivery to accommodate smaller classes then student achievement gains will be minimal

²⁶Furno, Orlando F., and Collins, George J., Class Size and Pupil Learning. Baltimore: Baltimore City Public Schools, 1967.

²⁷Glass, Gene V., and Mary Lee Smith, "Meta-Analysis of Research on the Relationship of Class Size and Achievement," Laboratory of Educational Research, University of Colorado, September 1978.

at best. As Varner reports in a study conducted for the National Education Association:

Research findings do not indicate that there is a one best class size, nor one best teacher/pupil ratio. However, it seems clear that in a small class a good teacher can devote more attention to individual pupils and their particular educational and emotional needs than the same teacher can devote in a substantially larger class. It appears that the teacher, his instructional methods, and his personal outlook are important factors that make a difference as class size varies. If the teacher approaches a small class just as he does a large class, the measurable differences between the two groups will be negligible.²⁸

Frymier, in his study of first-grade reading achievement as affected by class size, found that there was a statistically significant mean score difference in reading achievement favoring students in small classes. Although Frymier set adequate research controls for students in small and large classes, the only teacher variables controlled for were levels of educational and work experience. Questions of teacher competence and instructional techniques employed were not addressed. Also, large classes were defined as having 36 or more children while small classes contained 30 or less children. By today's standards, most first grade classes already have less than 30 students; therefore the study's findings have questionable utility for contemporary educators.²⁹

²⁸Varner, Sherrell E., "Class Size," Washington, D. C.: NEA, Research Division, (No. 434-22810), 1968.

²⁹Frymier, Jack R., "The Effect of Class Size Upon Reading Achievement in First Grade." Reading Teacher, 18 (November, 1964), pp. 90-93.

When Woodson examined this issue, he employed a large sample of fourth and sixth graders representing 95 school districts. Based on the correlations developed in this study, Woodson offers the following conclusions:

1. There is a small inverse relationship between the size of classes in a district and the academic achievement of its pupils as predicted by a measure of academic potential.
2. Relationships between class size and student achievement are not the same for students with different academic potential. Low ability students were the only group in the sample that showed a significant correlation between class size and academic achievement and this was an inverse relationship. Further: Nor was the weight of the evidence sufficiently clear to conclude that the scholastic achievement of the lower ability pupil was influenced to a greater extent by the size of the class in which he studied than was the achievement of the student of higher academic potential.³⁰

It cannot be determined in this study whether the relationship between class size and student achievement in reading and mathematics is the same. The correlation evidence only suggests a relationship in reading and math between class size and student achievement. Further, of the 24 differences examined, only four were statistically significant at the .05 level, and of the four significant differences, three involved the low ability students with I.Q.s of 85 and below.

Problems with this study were that the sample was not randomly selected, there was no control for teacher variables,

³⁰Woodson, Marshall S., "Effect of Class Size as Measured by an Achievement Test Criterion." IAR Research Bulletin, Vol. 8, No. 2, (February, 1968).

and the districts with the greater number of small classes were more affluent than the other districts in the sample. Woodson most significantly concludes that, "the findings from this study documented the fact that the relationship between pupil achievement and class size is not a simple one."

While other states have adopted staffing ratios and professional organizations and educational researchers have recommended ratios or formulas for staffing, research has not been definitive in identifying a specific set of ratios that will lead to optimum educational efficiency and effectiveness.

The knowledge and experience of educators who have dealt with the problems of school staffing can be best applied to developing a reasonable set of ratio ranges. Since there is no general agreement on one number or ratio that answers the questions of district complexity and specific school situations, a set of staff ratio ranges that incorporates the best experiences and thinking at the national, state and local levels should be developed.

III. PROCEDURES

New Jersey Department of Education data files were used to provide a data base of New Jersey staffing patterns. District Fall Reports for 1976-77, 1977-78 and 1978-79, state aid reports for 1978-79 and the 1978 district socio-economic files (DFG) were merged by computer to generate the following array of data.

- A three-year trend in staffing patterns for 1976-77, 1977-78, 1978-79 was computed and organized by district and county.

- The effects of selected complexity factors on staffing patterns for 1978-79 were computed and organized by:

- a. District Grade Organization -- K-12, K-6, K-8, 9-12, 7-12 and County Vocational;
- b. Enrollment Size Intervals -- up to 1000, 1001-3000, 3001-6000, over 6000;
- c. District Wealth Factors -- equalized valuation up to \$78,000, \$78,001 to \$114,000, above \$114,000;
- d. Socio-economic Status -- (District Factor Group A, B, C, D, E, F, G, H, I, J, V, and Z); and
- e. Community Types -- Urban, Suburban, Rural, Regional and Vocational

A group of experienced local superintendents, county superintendents and department staff reviewed administrative, instructional and educational services certificate titles. Using a Delphi technique, the group placed certificated titles into the

following categories: administrative personnel, supervisors/coordinators, instructional personnel, or educational services personnel.

As a result, certified titles that were categorized by the committee were coded for data manipulation (see Appendix A) and the following ratios were computed:

Certificated Staff

1. Instructional Personnel to Administrative Personnel
2. Students to Administrative Personnel
3. Instructional Personnel to Supervisors/Coordinators
4. Students to Instructional Personnel
5. Students to Educational Services Personnel

Non-Certificated Staff

1. Students to Food Services Personnel
2. Students to Operational Plant Services Personnel
3. Students to Maintenance Services Personnel
4. Students to Pupil Transportation Services Personnel
5. Students to Instructional Aides
6. Instructional Personnel to Instructional Aides

While additional ratios were of interest, the limitations of the data base precluded further analyses.

A. Description of Terms Used in This Analysis

As it was necessary to use statistical techniques in this analysis, fundamental terms require some review. Though the concepts involved are rather straightforward, the statistics

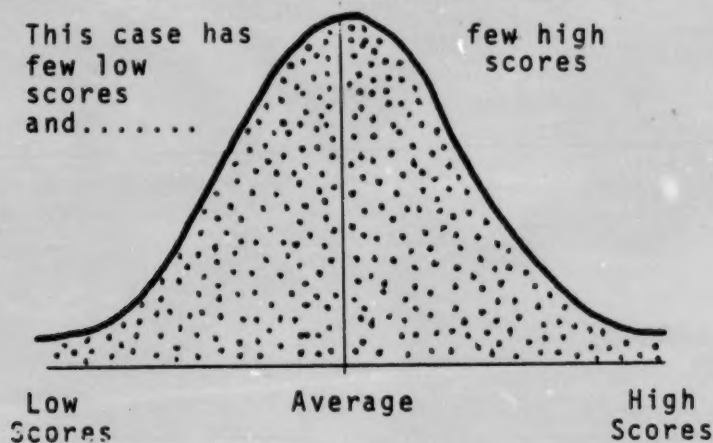
involved are sometimes complex. Nevertheless, some basic descriptions must be given.

Ratio. This is the general and common use of the word; for example, the student to instructors ratio is simply how many students there are to how many teachers.

Number of Districts. This is the number of valid districts in the group being examined; thus, non-operating districts would not be included in the analysis.

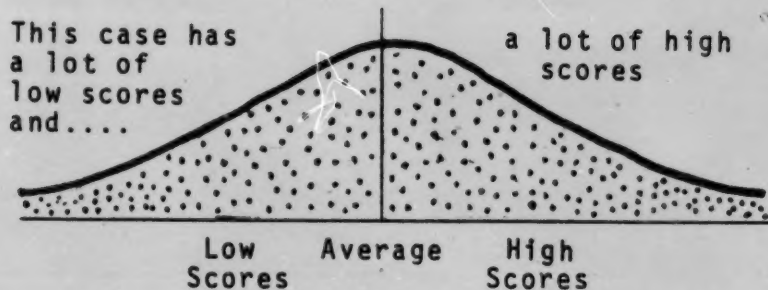
Average. This is the commonly used definition of the arithmetic mean; for example, the scores of all districts would be added together and divided by the number of districts.

Standard Deviation. This is a common statistical indicator of the distribution of a set of scores. While this is a difficult indicator to explain, it is an index of how far away from the average the scores are located. For example,



and, consequently, has a small standard deviation.

Whereas:



and, consequently, has a large standard deviation.

Relative Size of the Differences. As this study must be concerned with whether districts have high or low staff ratios, the concept of standard deviation is very important to determining what "high" or "low" means in practice. A further criteria, however, is needed to make the terms comparable. The size of the differences between ratios is given more meaning by dividing the standard deviation by the average. This gives a common index of large and small differences so that they can be compared and is technically known as the "coefficient of variation."

In other words, administrator/students ratios range in the hundreds while instructor/students ratios are thirty or less. By using this index, we can directly compare these two ratios, in terms of "high" and "low." The size of the differences is a relative measure. As a rule of thumb, an index of .20 or less

shows that there is little variation or difference between the districts while an index of .36 or higher shows a wide variation in staffing practices for the group.

Skewness. This is a relative indicator of whether the distribution is shaped symmetrically or like a normal bell curve. Staffing patterns often do not take the form of a normal or standard bell curve. If staffing ratios are not distributed normally, this means we have to be cautious about interpreting the data. Before being conclusive, we would have to find out why the distribution is not normal and take these reasons into account before judging whether a ratio was excessively high or low.

For the purposes of this report, the dominant indicators used in the analysis that follows are: the mean, which denotes the average ratio within each subset; the standard deviation, which aids in comparison of extremes within each ratio; the coefficient of variation for determining wide differences; and skewness for determining if the data is normally distributed.

B. Data Analysis

1. Certificated Staff

The most important consideration in examining certificated staff is in terms of the number and kinds of personnel supervised, and the extent to which these ratios exhibit excessive or underutilization of staff. There are no clear answers to

these concerns, as elementary districts have different needs than do secondary districts. Similarly, the size of districts, their socio-economic status, wealth and community type (urban, suburban or rural) need to be examined as these variables may also be associated with high or low ratios. For this analysis it must, however, be remembered that an organizational layer of supervisors and coordinators frequently exists between the administrators and the teachers. This supervisory level most frequently exists at the secondary level where the high school is divided into departments by subject matter area. The organizational structure of the high school generally has additional support services and personnel than is ordinarily found at the elementary level.

a. Instructional Personnel to Administrative Personnel

By scanning the instructional to administrative staff ratios in Tables A-D, it can be observed that the average ratios were all above 15 instructors per administrator with the exception of the county vocational schools.

In Table I-A, the instructors to administrators ratios by organization type indicated that the average ratios of instructors to administrators ranged from a low of 13.2 for the county vocational districts to a high of 22.2 for the 7-12 districts.

TABLE I-A

INSTRUCTORS/ADMINISTRATORS

By Organization Type

Districts	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences $\left(\frac{SD}{Mean}\right)$	Skewness
K-6	71	15.50	6.12	.39	-.02
K-8	232	16.87	5.97	.35	1.42
K-12	210	18.73	3.78	.20	.89
9-12	32	21.56	5.81	.27	.80
7-12	16	22.22	9.05	.41	2.42
County Vocational	20	13.23	6.56	.50	.88

While no consistent pattern of differences was noted by organizational type; elementary districts, 7-12 districts, and vocational schools showed wide variations in staffing practices which require closer investigation to see if these wide differences or variations are justified. The small number of districts in the 7-12 and vocational areas also advise caution in interpretation.

In terms of district size as noted in Table I-B, larger districts had a greater proportion of instructors per administrator. Again, staff at the supervisory level may explain these variations. The widest variations were found in the smaller districts; that is, those districts with enrollments under 1000 pupils and districts with enrollment between 1001 and 3000 pupils.

TABLE I-B

INSTRUCTORS/ADMINISTRATORS

By District Size

Enrollment	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
to 1000	266	16.17	6.32	.39	.90
1001 to 3000	187	17.79	5.06	.28	2.67
3001 to 6000	86	19.66	3.45	.17	.66
6001 plus	44	21.95	4.21	.19	1.12

Large districts with enrollments over 6000 pupils had the largest proportion of instructors to administrators.

In Table I-C, large differences by wealth of district were not noted. Interestingly, low, medium and high wealth districts closely resembled each other with respect to their proportions of instructors to administrators. While the differences were relatively small, approximately plus or minus one student, low wealth districts showed the largest number of teachers to administrators; and high wealth districts showed the smallest number. Administrators in low wealth districts served more teachers per administrator than those administrators in medium or high wealth districts.

TITLE I-C

INSTRUCTORS/ADMINISTRATORS

By Wealth

Wealth	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
Low	190	18.31	6.01	.33	1.16
Medium	196	17.47	5.27	.30	-.21
High	196	17.15	5.76	.34	1.65

The community type analysis of Table I-D showed that suburban districts had the smaller proportion of instructors to administrators though relative differences were not large between urban, suburban and rural.

TABLE I-D

INSTRUCTORS/ADMINISTRATORS
By Community Type

Community Type	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences $\frac{SD}{Mean}$	Skewness
Urban	155	18.00	4.41	.24	.77
Suburban	202	17.12	4.76	.28	.18
Rural	155	17.37	6.79	.39	1.05
Regional	50	20.92	7.01	.33	1.84
County Vocational	20	13.23	6.56	.50	.88

Regional high schools showed the largest proportion of instructors to administrators while vocational districts reported the smallest proportion. A wide difference was also noted for the county vocational districts.

To summarize, vocational schools had the fewest number of instructors per administrator and relatively large variations. The nature of vocational programs, their enrollment limitations governed by the number and kind of equipment used in the programs, and variations in methods of instruction would not necessarily reduce the number of administrators required to manage the school. While the proportions and variance need to be investigated further, the very uniqueness of vocational programs may serve

to partially explain these differences. Secondary and large enrollment districts had fewer administrators to teachers. Large variations in administrator staffing practices were noted in small districts, rural districts, and elementary districts.

b. Students to Administrative Personnel

While these ratios are mediated by teacher and supervisory variables, the examination of these data serves to illuminate the instructor to administrator ratios as presented in Tables I A-D.

TABLE II-A

STUDENTS/ADMINISTRATORS
By Organization Type

Districts	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
K-6	71	257.78	125.17	.49	.31
K-8	232	265.87	113.64	.43	1.90
K-12	210	309.35	70.67	.23	1.05
9-12	32	349.54	96.62	.28	.73
7-12	16	370.03	159.25	.43	2.27
County Vocational	20	178.69	125.31	.70	.37

A consistent administrative pattern by organizational type was noted in Table II-A with 9-12, 7-12 districts having proportionately more students to administrators and county vocational schools showing the smallest numbers of students

to administrators in this category. This variation could partially be explained by the nature and structure of vocational education programs and by the manner in which vocational schools reported their staff for full-time and shared time programs. The same pattern of variation was noted with the elementary and vocational districts showing the greatest difference. Likewise, K-8 and 7-12 districts noted large differences.

Smaller districts again had more administrators to students than larger districts (see Table II-B). This may reflect the relative constant level of administrative demands regardless of district enrollment size.

TABLE II-B

STUDENTS/ADMINISTRATORS

By District Size

Enrollment	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
to 1000	266	248.82	112.57	.45	.88
1001 to 3000	187	295.02	97.89	.33	3.52
3001 to 6000	85	327.61	64.12	.20	.79
6001 plus	44	384.28	77.58	.20	.66

Though a strong pattern was not noted in Table II-C, low wealth districts again had more students to administrators, and a relatively large variation was apparent.

TABLE II-C

STUDENTS/ADMINISTRATORS

By Wealth

Wealth	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
Low	190	310.77	115.89	.37	1.55
Medium	196	280.61	97.39	.35	-.02
High	196	265.64	103.98	.39	1.47

A strong pattern of students to administrators ratio by community types was not noted in Table II-D, and there were few differences between urban, suburban and rural districts. Aggregate data indicated that administrators served between 179 and 343 students.

TABLE II-D

STUDENTS/ADMINISTRATORS

By Community Type

Community Type	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
Urban	155	290.98	76.67	.26	.80
Suburban	202	274.24	91.50	.33	.17
Rural	155	286.84	136.94	.48	1.40
Regional	50	343.42	117.09	.34	1.88
County Vocational	20	178.69	125.31	.70	.37

Regional districts showed fewer administrators to students while vocational districts showed a greater proportion in this

category. The greatest variations were within the rural districts and the vocational districts.

This analysis tends to confirm the pattern of high variation and greater proportions of administrators for vocational schools. Secondary and large enrollment districts show smaller proportions of students to administrators. Large variations in practices were noted in small districts, rural districts and elementary districts.

c. Instructional Personnel to Supervisors and Coordinators

The category of supervisors and coordinators as an intermediate level between teachers and administrators is presented in Tables III A-D. Of the 582 districts in the sample, under half, 28 , reported supervisory staff. The statistical indicators used in this analysis were computed only for those districts reporting staff in this category. The relationship between instructional personnel and supervisors and coordinators by district grade organization, size, wealth and community type is highly skewed with extreme variations. Seemingly, this is indicative of wide differences in staffing practices at the supervisory level. Also, it is suspected that district personnel who did not report supervisory staffing data may have misinterpreted the instructions for reporting these data. A caution in interpreting the ratios is advised since a majority of districts reported no supervisory staff. Data presented in this section apply only

to the 48% of the districts who reported use of supervisory staff on their Fall Reports.

TABLE III-A

INSTRUCTORS/SUPERVISORS-COORDINATORS

By Organization Type

Districts	Districts (Valid.N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
K-6	6	40.00	17.40	.44	3.83
K-8	61	60.27	49.90	.83	3.91
K-12	165	63.39	52.45	.83	2.03
9-12	23	28.79	23.55	.82	1.54
7-12	12	48.96	45.21	.92	1.93
County Vocational	14	38.80	25.58	.66	1.37

As indicated on Table III-A, districts organized on a 9-12 grade plan maintained the smallest proportion of instructors to supervisors and coordinators. The elementary districts with K-6 and K-8 organizations were more skewed than other types of districts. Typically, elementary schools, while not departmentalized, employ reading, math, science and social studies supervisory staff or subject coordinators as professional support staff. Only 6 of the 71 districts organized on a K-6 basis, reported the use of supervisory staff. Similarly, 61 districts of the 232 K-8 districts reported using supervisory staff.

Secondary districts, the 9-12, 7-12 and the county vocational districts, are typically departmentalized. As expected,

the proportion of teachers to supervisory staff at the secondary level showed more commonalities than differences. This may reflect program structure commonalities that would require similar supervisory demands. The K-12 district grade organization showed the largest proportion of teachers to supervisors. In terms of supervisory staff, districts organized on a K-12 grade plan more closely resembled K-8 districts. The increased supervisory responsibility indicated in these data probably resulted from some subject area supervisors, such as reading or math coordinators, serving both elementary and secondary schools in the district. Also, many supervisors and coordinators function in this capacity on a part-time basis since they are employed as classroom teachers as well. This is particularly true of department chairpersons who are primarily classroom teachers with release time devoted to supervision and coordination of their departments.

Further, as indicated on Table III-B, districts with enrollments under 1,000 pupils had fewer teachers per supervisor. Districts with enrollments of 1001-3000 pupils had the largest proportion of teachers to supervisors.

TABLE III-B

INSTRUCTORS/SUPERVISORS-COORDINATORS

By District Size

Enrollment	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
to 1000	46	33.81	58.72	.58	2.46
1001 to 3000	110	71.62	36.06	.58	1.13
3001 to 6000	80	54.75	61.63	1.12	3.19
6001 plus	44	63.99	48.86	.76	2.26

Because smaller districts are generally elementary districts, the pattern established in the previous table held true here as well. That is, since elementary districts generally have smaller enrollments, wider variations and smaller proportions of administrators (see Tables I and II), it may follow logically that their supervisory personnel would be small and widely varied. Districts with fewer than 1,000 pupils had the smallest proportion of instructors to supervisors and coordinators. Districts with enrollments between 1,001 and 3,000 showed the largest proportion of instructors to supervisors and coordinators. Although larger districts tended to have similar staffing needs at the supervisory level, these data indicated that large districts had the widest differences in the supervisory category.

A similar trend established in the previous analysis also appeared in Table III-C; that is, high wealth districts had the smallest proportion and smallest variation of instructors

to supervisors and coordinators. Medium wealth districts maintained the largest proportion of teachers to supervisors.

TABLE III-C

INSTRUCTORS/SUPERVISORS-COORDINATORS

By Wealth

Wealth	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences $\left(\frac{SD}{Mean} \right)$	Skewness
Low	101	58.23	58.52	.99	2.41
Medium	102	63.89	61.41	1.04	2.63
High	77	50.23	41.01	1.22	2.80

These data, presented by community type, Table III-D, duplicate the pattern of wide variation and skewness established in the previous analysis of Table III-B.

TABLE III-D

INSTRUCTORS/SUPERVISORS-COORDINATORS

By Community Type

Community Type	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences $\left(\frac{SD}{Mean} \right)$	Skewness
Urban	95	62.00	46.32	.75	1.44
Suburban	100	60.61	53.07	.88	2.81
Rural	36	55.96	37.80	.68	2.61
Regional	35	49.36	61.21	1.24	4.30
County Vocational	14	38.80	25.58	.66	1.37

Urban districts had the largest number of teachers to supervisory personnel while county vocational districts had the smallest proportion.

To summarize, while the data for supervisory personnel are extremely skewed and widely varied, some interesting patterns emerged: K-8 and K-12 districts generally had fewer instructors to supervisors and coordinators. Also, urban districts, medium wealth districts and those districts with large enrollments had a larger proportion of teachers to supervisors.

d. Students to Instructional Personnel

Pupil to teacher ratios are presented in Tables IV A-D. As an overview of the average size of classes in New Jersey districts, it is interesting to find that among all categories, the average class size shows little variation or difference. Relatively small variation and little skewness were also characteristic of the ratios presented in Table IV-A.

TABLE IV-A

STUDENTS/INSTRUCTORS

By Organization Type

Districts	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
K-6	71	16.27	3.63	.22	.35
K-8	232	15.60	2.83	.18	-.49
K-12	210	16.51	1.52	.09	.3
9-12	32	16.62	1.83	.11	-.04
7-12	16	16.66	2.00	.12	.31
County Vocational	20	14.24	4.35	.30	-.01

The small variation in the ratios of students to instructors may be a product of increased teacher union demand gains, minimum staffing requirements, declining enrollment or other factors yet to be investigated. In considering the slight variations between district grade organization types, it is interesting to note that the number of students to instructors was relatively small. County vocational districts had slightly smaller average class sizes and greater variation due probably to such factors as variety in methods of instruction, "hands on" approaches, cooperative education, apprentice-type programs, and class enrollment limitations that are typically governed by the amount and variety of equipment and type of instruction. Further investigation may reveal that this finding also reflects the need for certain minimum levels of staff, regardless of district grade organization.

As might be expected, Table IV-B indicates that small districts with less than 1000 pupils, had proportionately smaller average class sizes. Similarly, larger districts with enrollments in excess of 6000 pupils, had slightly larger average classes. Since smaller districts were predominately elementary districts, it was interesting to note their smaller average class sizes.

TABLE IV-B

STUDENTS/INSTRUCTORS

By District Size

Enrollment	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
to 1000	266	15.22	2.96	.19	- .44
1001 to 3000	187	16.62	2.26	.14	1.04
3001 to 6000	85	16.66	1.38	.08	.53
6001 plus	44	17.55	1.78	.10	- .12

Additionally, per pupil wealth appeared to be associated with differences in staffing as noted in Table IV-C.

TABLE IV-C

STUDENTS/INSTRUCTORS

By Wealth

Wealth	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
Low	190	16.85	2.50	.15	-.29
Medium	196	15.94	2.48	.16	-.5
High	196	15.39	2.65	.17	-.41

Table IV-C suggests that per pupil spending differences may appear to influence differences in staffing, particularly when comparing these data on low wealth districts and their aggregate with those of high wealth districts. As might be expected, the average class size in high wealth districts was smaller than that of low wealth districts. It appears that

the district's spending ability affects the size of its classes.

It has been argued that different community types may show different staffing patterns. Table IV-D suggests that while a trend was noticeable, the relationship was not particularly strong or pronounced.

TABLE IV-D

STUDENTS/INSTRUCTORS

by Community Type

Community Type	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
Urban	155	16.18	1.76	.11	-.27
Suburban	202	15.92	2.44	.15	-.62
Rural	155	16.16	3.30	.20	-.11
Regional	50	16.46	1.84	.11	.05
County Vocational	20	14.24	4.35	.30	-.01

At the aggregated level, data on average class size by community type varied between 14 and 16 students per instructor. Again, county vocational districts had relatively smaller class sizes and wider variations than other districts in this category. Regional school districts had slightly larger average class sizes reflecting a proportionately smaller complement of staff per pupil.

In summary, average class size as reflected in pupil-teacher ratios showed little variation between and among the various categories analyzed.

e. Students to Educational Services Personnel

The student support system in New Jersey public schools is provided through educational services personnel, which includes the school nurse, pupil personnel services, guidance and counseling, child study team, library and media personnel. Educational services staff working individually or in concert are important to the student's academic, social and personal well-being. Tables V A-D describe the levels of students to educational services personnel. Since aggregated data were used, it cannot be determined from these data whether there were sufficient numbers of individual guidance counselors, nurses, learning disability, remedial or other educational services personnel to meet student needs. Therefore, specific conclusions and inferences with regard to this analysis cannot be made from these data.

Tables V A-D suggest that data on educational services personnel were limited and that a case study type of analysis would provide a more meaningful description of staffing patterns in this category.

TABLE V-A

STUDENTS/EDUCATIONAL SERVICES PERSONNEL
by Organization Type

Districts	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences ($\frac{SD}{50}$) (Mean)	Skewness
K-6	71	85.37	82.53	.97	4.30
K-8	232	90.91	59.77	.66	2.30
K-12	210	106.11	33.57	.32	1.28
9-12	32	91.58	20.13	.22	.33
7-12	16	108.25	20.57	.19	1.33
County Vocational	20	99.64	126.18	1.27	2.96

However, some general observations can be made. It was notable that the elementary and 9-12 grade organization districts showed similar staffing support averages. Also when K-12, 7-12, and county vocational districts were examined, they showed a larger proportion of students to educational services personnel and similar staffing support averages. Further, these data were highly skewed for elementary districts and county vocational schools because of variations in reporting by local districts. Secondary districts showed a tighter staffing pattern which may reflect some stability and uniformity of services. Elementary districts also showed wide variations, which may be the result of staffing inconsistencies at the elementary level. Because wide variations were evident, it is necessary to develop a more thorough study of the variables to determine if sufficient educational services personnel are currently available to New Jersey public school pupils.

It was observed that when districts were grouped by enrollment, (see Table V-B) the staffing patterns evident in the previously discussed ratios were also evident here.

TABLE V-B

STUDENTS/EDUCATIONAL SERVICES PERSONNEL

by District Size

Enrollment	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
to 1000	266	87.42	71.48	.82	3.17
1001 to 3000	187	98.98	29.72	.30	1.90
3001 to 6000	85	111.63	28.87	.26	.16
6001 plus	44	114.31	35.54	.31	.92

Again, small enrollment districts tended to have a smaller number of students per educational services personnel while larger districts appeared to have larger numbers of students per professional. It was important to note that wide variations were evident in the small enrollment districts. Wide variation existed within the wealth groupings, with low wealth districts showing the largest differences in average ratios.

TABLE V-C

STUDENTS/EDUCATIONAL SERVICES PERSONNEL

by Wealth

Wealth	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
Low	190	105.03	58.23	.55	4.20
Medium	196	95.04	44.22	.46	1.65
High	196	89.49	57.88	.65	2.73

Again, skewness and wide variation occurred. It appeared that the number of educational services personnel employed in a district was associated with the district's per pupil wealth. This table suggests that the district's spending ability may contribute, in part, to differences in staffing.

A pattern of wide variations and skewness within all community types was indicated in Table V-D with the single exception being regional districts. Suburban and county vocational districts appeared to be extremely skewed.

TABLE V-D

STUDENTS/EDUCATIONAL SERVICES PERSONNEL

by Community Type

Community Type	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD (Mean))	Skewness
Urban	155	103.40	46.41	.45	1.87
Suburban	202	89.57	50.78	.57	5.62
Rural	155	97.99	67.55	.69	1.92
Regional	50	96.87	22.70	.23	.41
County Vocational	20	99.64	126.18	1.27	2.96

While the averages suggest that perhaps minimum staffing of educational services personnel to students may exist for the state as a whole, adequate support may be missing in many districts. Urban and county vocational districts appeared to have the smallest number of educational services support staff. Interestingly, urban districts consistently showed larger numbers of students to professional staff, and usually had the largest proportion of students to the various categories of professional staff.

2. Non-Certificated Staff

Staffing data were also collected for non-certificated support staff (food services, operational plant, maintenance, transportation and instructional aide personnel). Review of these data (Appendix B) revealed limitations and inconsistencies that render the analysis inconclusive. To illustrate this:

Those districts that contract for food services, maintenance and transportation services may have reported zero (0) in the number of staff since the actual employment of these individuals is with the contractor rather than the school district.

Similarly, instructional aides are not employed in all districts or all schools within even those districts that do employ aides.

Aggregates within categories were affected by the significant number of districts reporting zero (0) and the interpretation of category placement by those individuals who originally reported the data. For instance, the reporting individuals may have interpreted their school janitors as operational plant or maintenance personnel depending upon their perception of that particular job. One district may have then reported its janitors as operational plant personnel while another may have reported janitors as maintenance personnel.

Thus, reporting inconsistencies between these categories is suspected.

A specific study design needs to be developed to overcome reporting problems due to:

- * contracting out for services
- * variation in building size which causes one person to fulfill four or five functions, and in other cases, demands a large staff concentrating on a single function
- * variation in reporting practice when the categories are not mutually exclusive and when interpretation of the function (i.e. operational plant vs. maintenance services) is ambiguous.

The analysis presented here is an overview of some general observations on staffing patterns for those districts utilizing non-certificated staff. The data provide some interesting generalizations for consideration.

Specifically:

1. Wide differences and variation in the staffing of food services, maintenance, operational plant and instructional aide personnel can be observed.
2. Elementary districts had fewer students to non-certificated personnel than did secondary districts.
3. It is interesting that K-12 districts tended to serve significantly more students per non-certificated support personnel than any of the other district organization types. County vocational districts, while seemingly serving a large number of students, may actually have reported duplicate counts for those vocational facilities organized on a shared-time basis.
4. As might be expected, K-6 districts served the smallest number of students to support staff. This appears reasonable since these districts are typically smaller and may not require transportation or food services for their students. This is particularly true if the schools in the smaller elementary districts are community schools.
5. The use of instructional aides varied greatly from

district to district. Typically, instructional aides served a variety of functions from cafeteria, playground and bus duties to assisting with instruction in reading, math and other subject areas. It is important to note that the majority of districts throughout the state reported zero in the use of aides within their districts. While this may be attributable to inconsistencies in reporting by local districts, elementary districts generally exhibited a more frequent use of instructional aides than did secondary districts.

6. When viewed from a different perspective, that is, from the instructor's vantage rather than the student's, the elementary teachers appeared to use more instructional aides than secondary teachers. This may be a function of the nature and structure of the elementary school or it could reflect the traditional use of the teacher's aide.

The non-reporting of non-certificated support staff substantially affected the statistical indicators generated for this analysis (see Appendix B for details). Caution is advised in the interpretation of these data and the analysis provided here. Further study would need to be done before any firm recommendations about the use of non-certificated support staff are advanced.

3. Staffing Pattern Trends

The following discussion on staffing pattern trends is limited to the three-year period beginning with the advent of T & E (1976 through 1979) and involves three selected ratios considered to be key to the beginning of such an analysis. Data arranged by ratio represent a rough gauge of the proportion of teachers to administrators, students to administrators, and students to teachers. The table on page 52 summarizes those data by county.

Data suggest that shifts in student enrollment and staffing at the administrative and instructional levels have occurred between 1976 and 1979. Although the exact cause of these shifts cannot be determined from the table, it appears that the effects of declining enrollment, new programs, school consolidation, deregionalization and new school openings most likely contributed to these changes. There was an overall increase in the proportion of instructors to administrators, a decrease in the proportion of students to administrators, and a decrease in the proportion of students to instructors. The student to instructor ratio seemed to have decreased more rapidly than the student to administrator ratio, reflecting the statewide enrollment decline of approximately eight percent. State and national enrollment data published through various sources document this fact.

Considering that the greatest percent of change occurred in the student to instructor ratio, it seems logical to assume that average class size has decreased. The effect of this change, however, was not felt in all districts or schools.

The second largest shift occurred in the instructor to administrator ratio, indicating that administrators have experienced an increase in the number of staff for which they are responsible, an important factor.

To summarize, the overall decline in the student to instructor ratio and its affect on class size seemed minimal in terms of the percent of change that occurred. However, reductions in class size at the individual district level significantly inflate per pupil expenditures. While it is clear that staff reductions cannot occur commensurately with enrollment decline, it is also apparent that staffing excesses in terms of cost efficiency are prevalent in some declining enrollment districts.

On the other hand, the teacher to administrator ratio has increased. It seems reasonable to assume that new federal and state mandated programs (e.g. bilingual, compensatory and special education programs) during this period may have caused districts to hire specialized teachers to meet these demands. Also, class size limitations as governed by special education program mandates seemingly influenced class sizes within counties and statewide as a whole.

In addition, several new schools opened during this period and others experienced an enrollment growth that possibly served to offset any dramatic enrollment decline experienced by individual districts.

While the table is useful as an overview, the reader is cautioned about making inferences and conclusions based on the data other than as aggregate percent of change information. As this study develops into its next phase, refinements will be made that may lead to other conclusions.

TABLE VI

The Percent of Change of Selected Ratios by County
Over the Three-Year Period, 1976-79

County	Instr./Adm.			Student/Adm.			Student/Instr.		
	76	79	%change	76	79	%change	76	79	%change
Atlantic	15.617	15.647	.19	289.584	265.31	- 8.39	18.298	16.659	- 8.96
Bergen	16.183	17.451	7.84	278.186	269.65	- 3.07	17.224	15.550	- 9.72
Burlington	15.297	17.940	17.28	272.592	296.32	8.70	17.625	15.901	- 9.79
Camden	17.951	16.957	- 5.54	340.083	287.28	-15.53	19.131	17.038	-10.95
Cape May	15.551	17.523	12.68	278.482	284.76	2.25	17.329	16.163	- 6.73
Cumberland	16.564	17.615	6.35	318.422	295.04	- 7.35	17.179	16.199	- 5.71
Essex	15.997	16.892	5.59	287.638	288.19	.19	17.663	16.629	- 5.86
Gloucester	17.364	15.916	- 8.34	323.191	277.65	-14.10	18.660	17.097	- 8.38
Hudson	19.899	20.576	3.40	365.656	340.31	- 6.94	18.071	16.466	- 8.89
Hunterdon	15.702	16.737	6.59	274.748	258.42	- 5.95	17.419	15.412	-11.53
Mercer	15.444	16.624	7.64	281.570	275.96	- 2.00	18.050	16.718	- 7.38
Middlesex	16.292	18.911	16.08	282.394	291.13	3.09	16.985	15.386	- 9.42
Monmouth	15.521	18.724	20.64	269.541	288.16	6.91	17.226	15.271	-11.35
Morris	16.535	16.255	- 1.70	289.727	261.29	- 9.82	17.403	16.017	- 7.97
Ocean	16.405	18.769	14.41	322.397	321.05	- .42	18.594	16.444	-11.57
Passaic	19.017	20.210	6.27	351.524	340.08	- 3.26	17.729	16.966	- 4.31
Salem	16.504	17.930	8.64	268.442	272.75	1.60	16.306	15.671	- 3.90
Somerset	17.229	17.356	.73	294.600	267.45	- 9.22	17.455	15.671	-10.23
Sussex	16.982	18.706	10.15	298.293	302.07	1.27	17.611	16.192	- 8.06
Union	17.132	17.535	2.35	298.759	275.22	- 7.88	17.230	15.455	-10.31
Warren	17.751	17.605	- .83	326.824	292.48	- 1.05	18.290	16.504	- 9.77

IV. RECOMMENDED GUIDELINES FOR SCHOOL STAFFING RATIOS

As a basis for formulating guidelines as to what constitutes appropriate staffing ratios in New Jersey schools and districts, the recommended guidelines in this section synthesize currently recommended or mandated school staff ratios from other states as well as those proposed by professional educational organizations. While the guidelines synthesized here are school based, they are useful in assessing the general appropriateness of district staffing ratios presented in this study.

It is important to recognize that in any district, school or program situation, three factors concertedly affect decisions about optimum or adequate staffing: the needs of the pupils to be served; the availability of qualified personnel; and the level of funding or financial support. In addition, the unique needs of school districts and their characteristics or complexity factors influence staffing requirements. As a result, no state, district, school, individual or group has developed an ideal staffing formula or ratios that would apply to all school districts nationally.

Hopefully, these guidelines can be used to develop a set of guidelines specifying school and district ratio ranges for New Jersey. This set of guidelines could assist T & E monitors in assessing the adequacy or excess of staff in local school districts; they would be particularly useful in examining the appropriateness of staff ratios in those districts identified at the high and low extremes of the ratios presented in this study.

The information presented in the following table was extracted from Guidelines for School Staffing Ratios, an ERS Report (Arlington, Virginia: Educational Research Service, Inc., 1974), pages 31-39. The table was developed by Glen Robinson, Director of Research for Educational Research Service, Inc. The data presented in the table were compiled and summarized not only from materials in ERS information files, but also materials from the Library of Congress, other educational and professional libraries in Washington D.C., LEA teachers' and administrators' negotiation agreements, state departments of education, ERIC Microfiche Collection, Current Index to Journals in Education and Education Index.

TABLE VII
School Building Staffing Ratios

Source	Recommended Ratio or Staff Composition
Conant	In junior high schools, 50 professional staff members to 1000 pupils, as a minimum. A better ratio in the junior high would be 59 professional staff members to 1000 pupils. In the senior high, a ratio of 52 professional staff members to 1000 pupils is recommended.
Council for Administrative Leadership	Based on a study of the junior high school in New York State, recommends the following optimum staffing pattern for a junior high school of 700-1000 pupils: - 1 principal 2 assistant principals 1 school nurse 1 part- or full-time psychologist 3 guidance counselors 1 part- or full-time coordinator of student activities 1 part- or full-time coordinator of instructional materials 1 reading consultant 1 speech correctionist
Cleveland Heights-University Heights School District (Ohio) staffing formula	Ratio of certificated classroom staff (except administrators) to pupils, 1:25.

School Building Staffing Ratios

Source	Recommended Ratio or Staff Composition
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American Federation of Teachers The following staffing for middle schools of 800 pupils is recommended in the AFT COMPAS program:

- 1 principal
- 1 administrative assistant
- Secretarial:
 - 1 for admissions/discharge
 - 1 for principal and administrative assistant
 - 1 for guidance department and clinical teams
 - 1 for extra duty assignments
 - 1 for payroll
 - 3 for teachers (1 per grade)
- 36 homeroom teachers (12 per grade)
- 3 grade mentors (lead teachers)—1 per grade
- Substitute teachers to equal 10 percent of the staff
- 2 attendance teachers (if needed)
- 1 lab assistant
- 1 industrial arts assistant
- 1 home economics assistant
- 1 librarian per 750 pupils
- 1 library assistant
- 1 speech teacher
- Clinical team:
 - 1 social worker
 - 1 psychologist
 - 1 part-time psychiatrist
- Medical team:
 - 2 full-time nurses
 - 1 part-time doctor
 - 1 dental hygienist
 - 1 part-time dentist
 - 1 part-time optometrist
- 3 guidance counselors (1 per grade)
- 1 paraprofessional for each subject teacher
- 1 street worker per grade (if needed)

Gruhn and Douglass The recommended size of a junior high school staff, including all professionals and secretarial help, varies by size of school, as follows:

Position	Schools of 101-300	Schools of 301-600	Schools of 601-1000	Schools of 1001-2000
Principal	1/3-2/3	2/3-1	1	1
Assistant principal	...	1/4-1/2	1/2-1	1-2
Counselors	1/3-2/3	2/3-1	1-2	2-4
Librarian	1/3-2/3	1	1-2	2-3
School nurse	1/4-1/2	1/2-1	1-1-1/2	1-1/2-2
School physician	...	1/4	1/4	1/2
Psychologist	...	1/4	1/2	1
Attendance officer, office clerks, secretaries	1/2-1	1-2	1-1/2-3	3-5
Supervisors and cur- riculum director	1/2	1	2	3-6
Classroom teachers	5-12	12-24	24-40	40-80
Totals	7-16	17-32	33-53	55-105

**North Central
Association**

A professional staff ratio of 1:20 pupils is exemplary for middle, junior, and senior high schools; a ratio of 1:25 is maximum.

School Building Staffing Ratios

Source	Recommended Ratio or Staff Composition				
Douglass	Douglass suggests the following staffing patterns for secondary schools of various sizes:				
	<u>Position</u>	<u>Schools of 1500-3000</u>	<u>Schools of 800-1500</u>	<u>Schools of 300-800</u>	<u>Schools of 100-300</u> <u>Schools of less than 100</u>
	Principal	1	1	1/2	1/3-2/3 ...
	Vice principal or coordinator of instruction	1	1/2-3/4	1/3-1/2	
	Vice principal or director of athletics	1	1/2-3/4	1/3-1/2	
	Vice principal or director of guidance	1	1/2-2/3	1/6-1/3	
	Psychologist	1/2-1	1/3-1/2	1/6-1/3	
	Counselors	6-10	3-6	1-3	1/3-1 ...
	Director of health and P.E.	1/2-1	1/4-1/2	1/6-1/3	
	Librarian	2-4	1-2	1/2-1	1/3-1/2 1/6
	Director of Athletics	1/2-1	1/3-1/2	1/6-1/3	1/6 ...
	Heads of departments or special supervisors	4-6	2-3	1-2	1/2-1 ...
	Attendance supervisor	1-2	2/5-4/5	1/5	
	Physician	1	1/2-1	1/6-1/2	
	Nurses	2-5	1-2	2/5-1	1/5-2/5 ...
	Dentist	1-2	1/2-1	1/6-1/2	
	Director of testing and research	1	1/3-1/2	1/6-1/3	
	Office secretary and clerks	5-8	3-5	1-3	1/2-1 ...
	Director of cafeteria	1	1	1/2-1	1/3-1/2 ...
Illinois Task Force on Education	Recommended ratio of 60 professional staff members to 1000 pupils in large secondary schools (over 1500 pupils). For smaller secondary schools, the ratio should increase inversely to 80 professional staff members to 1000 pupils, so that in schools with only 200 pupils, 16 professional staff members are employed.				
McLure and Pence	Based on study of innovative elementary (10), middle (11), and high schools (9), reports following <u>average</u> staffing ratios:				
	<u>Average number of:</u>	<u>Elementary schools</u>	<u>Middle schools</u>	<u>High schools</u>	
	Pupils	697	1170	1697	
	Teachers	27.4	51.3	76.7	
	Nonteaching professionals	2.2	6.9	9.3	
	Pupils per teacher	25.4	22.8	22.1	
	Pupils per academic staff member	23.5	20.1	19.7	
	Teachers per academic staff member for nonteaching functions	12.5	7.4	8.2	
	Teachers per teacher aide	8.0	N/A	N/A	
Ohio statute	35 classroom teachers per 1000 pupils + 5 percent of this number (teachers) for counselors, librarians, visiting teachers, and school nurses				

School Building Staffing Ratios

Source	Recommended Ratio or Staff Composition
Malinka	Recommended staffing for a middle school with 600 pupils is as follows: 1 principal 2 guidance counselors 7 sixth-grade teachers of academic subjects 12 seventh and eighth grade teachers for academic subjects (3 each for language arts, social studies, science, and math) 6 specialist for unified arts (2 each for art, home economics, and industrial arts) 3 specialists for health/physical education 2 specialists for music 1 specialist in charge of instructional materials center (+ part-time aide where financially feasible) 1 special education teacher 1 foreign language teacher 1 teacher for typing and/or business 1 part-time teacher for agriculture 1 secretary 2 teacher aides 3 custodians - Cafeteria help as needed
NASSP commission on staff utilization	The Commission on the Experimental Study of the Utilization of Staff in the Secondary School in 1957 recommended that the staff for 1000 students should consist of the following: 12 teacher specialists 12 general teachers 12 instructional assistants (preprofessionals), or the equivalent 6 clerical assistants 3 general aides - Suitable number of pupil personnel specialists
Northwest Association of Secondary and Higher Schools	At least one administrator devoting not less than 1/4-time to administrative duties for the first 299 (or fewer) pupils enrolled in senior high schools and one full-time administrator for senior high schools of 300-550 pupils. One additional administrator shall be assigned for each 500 pupils or major fraction thereof. An administrator is defined with the following examples: superintendent, principal, vice principal, athletic director, attendance director, activity director, dean of students, and department heads with released administrative time. A ratio of 1 teacher to 25 pupils is the recommended minimum. The term "teacher" describes the classroom teacher, certificated instructional materials center personnel, aides to teachers and certificated instructional materials center personnel for as much time as they give to instruction, paraprofessional aides (counted as one-third of a teacher) and interns (counted as two-thirds of a teacher).
Washington State Board of Education rules and regulations	For junior-senior high schools with enrollments under 150 pupils (grades 7-12), the following minimum personnel are required: 1/2 administrator 8 teachers 1/2 librarian 1/2 counselor 4/7 clerk

School Building Staffing Ratios

Source	Recommended Ratio or Staff Composition																																																						
Grossmont Union High School District (Calif.) guidelines	In the Grossmont Union High School District, the personnel units for a school are determined by the application of a factor or constant, the size of which ranges from 20-23. The variation in the constant reflects the variation in program from school to school. For example, if a school has 20 as its constant factor and its anticipated enrollment for the year in question is 2000, one would calculate that the school would be awarded 100 personnel units by dividing 20 into 2000. By definition, a personnel unit is a unit the dollar equivalent of which is the average cost of a teacher in the district for the year in question. The cost of other personnel is calculated against this benchmark amount. For example, a clerk may cost an average of \$5500, which is equivalent to 1/2 or .5 personnel unit since the average teacher salary was designated as \$11,000. The cost of a teacher aide may be calculated to be 1/3 of \$11,000 or 1/3 of a personnel unit. If a principal is awarded a personnel unit, he has the option in this example of using it to employ one teacher, or two clerks, or three teacher aides or some combination thereof. In this way, a principal can equate costs of the various positions employed in a school and determine what "mix" of persons would provide the necessary services. The first year a school enters this program, it determines its constant factor, based on present staff, by adding the unit value of present staffing and dividing the enrollment by that figure. To enrich a program thereafter, the constant factor is lowered, thus providing additional staff positions.																																																						
Kern High School District (Calif.) staffing formula	The formula for determining the total certificated staff (teaching and non-teaching) in the district's high schools and the formula for determining the number of administrative periods (principals, assistant principals, deans, counselors, attendance and testing personnel, and the curriculum coordinators), are based on pupil enrollment, as follows: <table><thead><tr><th rowspan="2">Enrollment interval</th><th colspan="2">Total certificated staff</th><th colspan="2">Administrative periods</th></tr><tr><th>Pupils per staff member</th><th>Ratio change per 100</th><th>Pupils per administrative period</th><th>Ratio change per 100</th></tr></thead><tbody><tr><td>100 - 200</td><td>14.1 - 15.3</td><td>1.20</td><td>18.0 - 19.9</td><td>1.90</td></tr><tr><td>200 - 300</td><td>15.3 - 16.4</td><td>1.10</td><td>19.9 - 21.4</td><td>1.50</td></tr><tr><td>300 - 600</td><td>16.4 - 18.7</td><td>.77</td><td>21.4 - 24.9</td><td>1.17</td></tr><tr><td>600 - 1000</td><td>18.7 - 20.7</td><td>.50</td><td>24.9 - 28.5</td><td>.90</td></tr><tr><td>1000 - 1500</td><td>20.7 - 22.5</td><td>.36</td><td>28.5 - 31.9</td><td>.68</td></tr><tr><td>1500 - 2000</td><td>22.5 - 23.8</td><td>.26</td><td>31.9 - 34.5</td><td>.52</td></tr><tr><td>2000 - 3000</td><td>23.8 - 25.1</td><td>.13</td><td>34.5 - 38.7</td><td>.42</td></tr><tr><td>3000 - 4000</td><td>25.1 - 25.9</td><td>.08</td><td>38.7 - 42.3</td><td>.36</td></tr><tr><td>4000 - 5000</td><td>25.9 - 26.4</td><td>.05</td><td>42.3 - 45.8</td><td>.35</td></tr></tbody></table>	Enrollment interval	Total certificated staff		Administrative periods		Pupils per staff member	Ratio change per 100	Pupils per administrative period	Ratio change per 100	100 - 200	14.1 - 15.3	1.20	18.0 - 19.9	1.90	200 - 300	15.3 - 16.4	1.10	19.9 - 21.4	1.50	300 - 600	16.4 - 18.7	.77	21.4 - 24.9	1.17	600 - 1000	18.7 - 20.7	.50	24.9 - 28.5	.90	1000 - 1500	20.7 - 22.5	.36	28.5 - 31.9	.68	1500 - 2000	22.5 - 23.8	.26	31.9 - 34.5	.52	2000 - 3000	23.8 - 25.1	.13	34.5 - 38.7	.42	3000 - 4000	25.1 - 25.9	.08	38.7 - 42.3	.36	4000 - 5000	25.9 - 26.4	.05	42.3 - 45.8	.35
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Ocean View Elementary School District (Calif.) staffing formula	Each school is allocated FTE staff units, based on enrollment. A staff unit is defined as a personnel item, either certificated or classified, with the prior year's average salary on the teachers' certificated schedule being the equivalent of one unit. Units are assigned as follows: 1 staff unit per 29 pupils in kindergarten 1 staff unit per 28 pupils in grades 1-3 1 staff unit per 29 pupils in grades 4-8 Special education teachers are allocated separately.																																																						
Buena Vista School District (Mich.) negotiation agreement	Ratio of certificated staff (except administrators) to pupils, 1:29.																																																						

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School Building Staffing Ratios

Source	Recommended Ratio or Staff Composition
Orange (Calif.) staffing formula	<u>In junior high schools:</u> Divide adjusted enrollment* by 23 to determine the number of certificated employees (excluding nurses, librarians, special education teachers), to include 1 principal, 1 assistant principal in schools with 500 or more pupils, 1 counselor in schools with 600 or fewer pupils, 1-1/2 counselors in schools with 601-999 pupils, and 2 counselors in schools with 1000 pupils or more. To determine overall certificated staff, allot 1 certificated staff (includes <u>all</u> certificated staff positions) per 14 pupils (includes educationally handicapped, educable mentally retarded, and hard of hearing pupils). Add 3 teaching periods per lunch period for noon supervision or for district department chairmanships; for activities and attendance, add 2 periods for up to 1000 pupils enrolled, 3 periods for 1001-1500 pupils, and 4 periods for 1501-2000 pupils. *Enrollment is adjusted as follows: delete special education pupils; add 4 students for each lunch period; add 8 students for activity and attendance in schools enrolling up to 1000 pupils; add 12 students for activity and attendance in schools enrolling over 1000 pupils. <u>In senior high schools:</u> Divide adjusted enrollment** by 24 to determine the number of certificated employees (excluding driver education teachers, administrative trainee periods, district department chairmanships, one-half of the work-experience staff, vocational teachers, title program teachers, librarians, and nurses), to include 1 principal, 2 assistant principals, 1 dean for schools enrolling 1000-2000 pupils, 2 deans for schools enrolling over 2000 pupils, and one counselor for every 350-400 pupils. To determine overall certificated staff (includes special education and special program teachers, driver education teachers, nurses, and librarians), allot one certificated employee per 23 pupils (includes special education students). Add one teaching period for each lunch period, 1 teaching period for each period a district department chairman is released. **Enrollment is adjusted as follows: delete special education pupils; add 5 pupils for each lunch period; add 24 pupils for activities and attendance.
Racine (Wis.) staffing formula	To determine staffing of elementary schools for positions other than the principal, office secretary, instrumental music teacher, remedial speech teacher, and teachers of special education classes, values are assigned to staff members as follows: 1.0 teachers, special subject teachers, administrative assistants 0.5 interns 0.4 auxiliary aides and instructional secretaries The ratios exclude staff hired with federal funds or funds from other than local sources. In determining staff allotment, all decimal fractions are rounded to the nearest half. The ratios for elementary schools are as follows: Outer-city and county schools -- 1:26.8 Inner city schools -- 1:19 The building principal, conferring with his professional staff, develops a staffing plan, which is subject to the approval of the superintendent and instructional division staff.
Charlevoix (Mich.) negotiation agreement	Ratio of pupils to teachers and other professional personnel shall not exceed 24:1.

School Building Staffing Ratios

Source	Recommended Ratio or Staff Composition																																																																																																																																																																																													
Brevard County (Fla.) staffing formula	The basis of staffing plans for individual schools is either instructional units or school service units. Instructional units are awarded on the basis of projected full-time equivalent pupils by program (K-3, 4-10, 11-12, exceptional education, career education, adult education). The ratio established is dependent on available revenues. The ratio for 1974-75 is 30.0 in elementary, middle, and junior and senior high schools. To permit utilization of specialists in the elementary school and to provide for all class periods beyond five per teacher in the secondary school, a factor is added to the calculated instructional units. In elementary programs (K-3 and 4-6) the factor is 1.17; a factor of 1.20 is applied to 4-10 and 11-12 units. Allocations are based on projections of students in the spring. Service units are based on enrollment. (The Superintendent designates enrollment category for use in any school whose enrollment is in overlap status in the following table.) <table><tr><th></th><th colspan="8">Enrollment</th></tr><tr><th></th><th>0- 350</th><th>300- 700</th><th>600- 1000</th><th>900- 1300</th><th>1200- 1600</th><th>1500- 1900</th><th>1800- 2200</th><th>Over 2200</th></tr><tr><td>Principal</td><td colspan="8">←----- One per school -----→</td></tr><tr><td>Elementary curriculum coordinator</td><td>1/2</td><td>1</td><td>1</td><td>1</td><td>N/A</td><td colspan="3">-----→</td></tr><tr><td>Assistant principal</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td> Middle school</td><td>N/A</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>N/A</td><td>-----→</td></tr><tr><td> Junior high school</td><td>N/A</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>N/A</td><td>-----→</td></tr><tr><td> Senior high school</td><td>N/A</td><td>-----→</td><td>1</td><td>1</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Media specialist</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td> Elementary school</td><td>1/2</td><td>1</td><td>1</td><td>1</td><td>N/A</td><td colspan="3">-----→</td></tr><tr><td> Middle school</td><td>N/A</td><td>1</td><td>1</td><td>1</td><td>2</td><td>2</td><td>N/A</td><td>-----→</td></tr><tr><td> Junior high school</td><td>N/A</td><td>1</td><td>1</td><td>1</td><td>2</td><td>2</td><td>N/A</td><td>-----→</td></tr><tr><td> Senior high school</td><td>N/A</td><td>-----→</td><td>1</td><td>1</td><td>2</td><td>2</td><td>2</td><td>2</td></tr><tr><td>Dean of students</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td> Middle school</td><td>N/A</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>N/A</td><td>-----→</td></tr><tr><td> Junior high school</td><td>N/A</td><td>0</td><td>0</td><td>1</td><td>1</td><td>1</td><td>N/A</td><td>-----→</td></tr><tr><td> Senior high school</td><td>N/A</td><td>-----</td><td>1</td><td>2</td><td>2</td><td>2</td><td>2</td><td>3</td></tr><tr><td>Guidance</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td> Middle school</td><td>N/A</td><td>1:375</td><td colspan="4">-----→</td><td>N/A</td><td>-----→</td></tr><tr><td> Junior high school</td><td>N/A</td><td>1:375</td><td colspan="4">-----→</td><td>N/A</td><td>-----→</td></tr><tr><td> Senior high school</td><td>N/A</td><td>-----→</td><td colspan="6">1.375-----→</td></tr></table>		Enrollment									0- 350	300- 700	600- 1000	900- 1300	1200- 1600	1500- 1900	1800- 2200	Over 2200	Principal	←----- One per school -----→								Elementary curriculum coordinator	1/2	1	1	1	N/A	-----→			Assistant principal									Middle school	N/A	1	1	1	1	1	N/A	-----→	Junior high school	N/A	1	1	1	1	1	N/A	-----→	Senior high school	N/A	-----→	1	1	2	2	2	2	Media specialist									Elementary school	1/2	1	1	1	N/A	-----→			Middle school	N/A	1	1	1	2	2	N/A	-----→	Junior high school	N/A	1	1	1	2	2	N/A	-----→	Senior high school	N/A	-----→	1	1	2	2	2	2	Dean of students									Middle school	N/A	0	0	1	1	1	N/A	-----→	Junior high school	N/A	0	0	1	1	1	N/A	-----→	Senior high school	N/A	-----	1	2	2	2	2	3	Guidance									Middle school	N/A	1:375	-----→				N/A	-----→	Junior high school	N/A	1:375	-----→				N/A	-----→	Senior high school	N/A	-----→	1.375-----→					
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Pentucket School District (Mass.) negotiation agreement	<u>Elementary schools:</u> 35 professional staff members per 1000 pupils (excluding kindergarten teachers, the principal, librarian, and reading consultant). <u>Secondary schools:</u> 40 professional staff members per 1000 pupils [excluding the principal, assistant principal, and guidance counselor(s)].																																																																																																																																																																																													
Chelsea (Mich.) negotiation agreement	Ratio of total professional staff in a secondary school building to pupils will be 1:27.																																																																																																																																																																																													
Clarenceville School District (Mich.) negotiation agreement	Ratio of professional staff (non-administrative) to pupils, 35:1000.																																																																																																																																																																																													
Hancock (Mich.) and Menominee (Mich.) negotiation agreements	Ratio of total professional staff in any school building to pupils will be 1:27.																																																																																																																																																																																													

School Building Staffing Ratios

Source	Recommended Ratio or Staff Composition																																	
Lincoln (Nebr.) staffing formula	An allocation of staffing points is assigned each building on the basis of its projected fall enrollment. For the purpose of allocation, kindergarten pupils are counted as one-half and educable mentally retarded students as double. Buildings with less than 600 pupils are allocated an additional point for each multiple of 50 or portion of 50 pupils. In allocating staff, principals may request staff whose total allocation points equal the school's enrollment. The intent is to keep total staffing within the present general range but also to provide principals with greater flexibility in choice and assignment of staff. All staff assigned to a building are counted against the allotment according to the following schedule, except for nurses, staff for handicapped other than EMH, and staff for interscholastic athletics and driver education. Staff and allocation points include, but are not limited to, the following: <table><tr><th>Position</th><th colspan="2">Allocation Points</th></tr><tr><th></th><th>Elem.</th><th>Sec.</th></tr><tr><td>Principal</td><td>28</td><td>30</td></tr><tr><td>Assistant administrator</td><td>26</td><td>27</td></tr><tr><td>Coordinator (an instructional leadership role involving double stipend)</td><td>24</td><td>24</td></tr><tr><td>Team leader (an instructional leadership role involving single stipend)</td><td>22</td><td>22</td></tr><tr><td>Teacher (anyone paid on the teacher schedule, including librarians, counselors, etc.)</td><td>20</td><td>20</td></tr><tr><td>Associate teacher (half-time professional limited to first two steps on salary schedule)</td><td>8</td><td>8</td></tr><tr><td>Instructional aide (working 6 hours per day, includes accompanists and lab assistants)</td><td>6</td><td>6</td></tr><tr><td>Clerk (8 hours per day)</td><td>8</td><td>8</td></tr><tr><td>Optional period assignments</td><td>0</td><td>2</td></tr></table>	Position	Allocation Points			Elem.	Sec.	Principal	28	30	Assistant administrator	26	27	Coordinator (an instructional leadership role involving double stipend)	24	24	Team leader (an instructional leadership role involving single stipend)	22	22	Teacher (anyone paid on the teacher schedule, including librarians, counselors, etc.)	20	20	Associate teacher (half-time professional limited to first two steps on salary schedule)	8	8	Instructional aide (working 6 hours per day, includes accompanists and lab assistants)	6	6	Clerk (8 hours per day)	8	8	Optional period assignments	0	2
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Optional period assignments	0	2																																
Ithaca (N.Y.) negotiation agreement	In junior and senior high schools, 21.65 professional staff members per 1000 pupils.																																	
Harlandale School District (Texas) staffing formula	The allocation of personnel is determined by the enrollment of the school, based on the following formulas for determination of units earned under the state minimum foundation program: Classroom teacher units = $\frac{ADA}{25}$ Special service units = $\frac{\text{Classroom teacher units}}{20}$ Counselors and supervisors = $\frac{\text{Classroom teacher units} - 40}{50} + 1$ Full-time principals = $\frac{\text{Classroom teacher units} - 20}{30} + 1$ Part-time principals (and assistants) = 1 part-time principal per full-time principal (or assistant) Teacher aides = $\frac{\text{Classroom teacher units}}{20}$ Special education aides = 1 for each 5 instructional units approved																																	

V. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

A. Summary

Major components of the T & E law require districts to provide adequate educational programs and services to meet identified learner needs. Generally, district staffing patterns reflect the breadth of the educational programs as well as the manner in which the programs are delivered in a local school district.

This report reviewed staffing patterns by district categories including grade organization type, community type, district enrollment and wealth. Staffing ratios were computed as indicators of district staffing patterns and practices. Statistical descriptors concentrated on analyzing and reporting average staff ratios within each category.

Current staffing practices were reported as average ratios at the district level rather than at the school or program level.

To meet the expectations of a "thorough and efficient system of education," districts must provide adequate levels of support that ensure a high-quality educational program at a reasonable level of cost. Staffing data generated by this study showed a wide range of ratios in each category. Districts at the high or low extreme of these ranges were identified. Further analysis of these identified districts through the monitoring process may indicate non-compliance with T & E and/or the existence of optimum, inadequate or excessive staff levels.

Further definitive analyses of New Jersey staffing practices should correlate district complexity factors and their effect on staffing practices since these factors influence much of the variation found in staffing practices between districts. District complexity factors include, but are not limited to: level of enrollment fluctuation; the number of schools and buildings in a district; student composition with regard to special programs and populations; the socio-economic status of students; and school and district MBS success levels.

The three-year trend in administrator and instructor staffing patterns indicated that relatively rapid shifts are occurring within these categories. Declining enrollment, budget caps and other factors appeared to exert influence on these shifts. It cannot currently be determined which factors exert the most influence and to what extent the delivery of and student access to educational programs are affected by these factors. However, at the aggregate levels, it appears that districts with increasing enrollment tended to offset the staffing changes caused by districts with declining enrollment.

The following conclusions and recommendations are intended to provide an initial basis for state-level policy decisions on staffing practices in local school districts.

B. Conclusions

The major conclusion of this report is that the current staff ratio ranges by category indicate levels of variation

that appear to be unacceptable in terms of a local district's ability to provide both a thorough and efficient system of education. For example, the following table illustrates the high and low extremes for three of the major staff ratios:

Ratio	Range		State Average
	Low	High	
Instructors to Administrators	4.0 to 1	51.5 to 1	17.6
Students to Administrators	146.7 to 1	1006.0 to 1	285.4
Students to Instructors	6.2 to 1	25.3 to 1	16.1

While variation is expected and desirable in terms of individual district needs, such wide ranges do not appear to be justifiable.

Responsibility for educational staffing has been the prerogative of local boards of education. The state has statutory authority to ensure that local districts provide an adequate level of staff to meet student needs. Analyses of the data generated for this report suggest that districts at the high and low extremes of these staff ratio ranges may be in non-compliance with T & E.

Specific conclusions by district category indicate that administrators in the following types of districts tended to supervise fewer teachers and students than administrators in other types of districts:

- County vocational districts
- Elementary districts (K-6, K-8)
- High wealth districts
- Small districts (under 1,000 students)

Conversely, the administrators in the following types of districts tended to have more administrative responsibilities in terms of greater numbers of teachers and students supervised:

- Urban districts
- Regional districts
- Large districts (over 3,000 students)
- Low wealth districts
- Secondary districts (7-12, 9-12)

Rural and vocational districts, however, exhibited the greatest variations in the administrator ratio categories. Specifically, ranges in the instructors to administrator category were:

Districts	Range		Average
	Low	High	
County Vocational	6.3 to 1	29 to 1	13.9
Rural	4 to 1	42 to 1	17.4

Although there is no established standard for the instructor to administrator ratio, the ratio ranges for county vocational and rural districts are illustrative of the need for appropriate staffing standards. The wide level of discrepancy between the high and low extremes may be indicative of major differences between districts in the delivery of programs and services to meet students' needs as mandated by Chapter 212.

Variations in average class size at the district level as measured by the students to instructor ratios were relatively small. The following districts tended to have a slightly larger number of students to instructors (larger average class sizes):

- Urban districts
- Regional districts
- Low wealth districts
- Large districts (over 6,000 students)

On the other hand, the following districts exhibited smaller average class sizes (fewer numbers of students to teachers):

County vocational districts
High wealth districts
Small districts (less than 1,000 students)

Considering the state average class size was 16.1 students per instructor, county vocational districts, at the low extreme, had the largest proportions of administrative staff and the smallest average class size. At the high extreme, regional school districts and the "31 urban districts," when separated from the larger urban district organization category, maintained the largest average class sizes. The following table highlights these extremes in relation to the state average of 16 to 1:

Districts	Range		Average
	Low	High	
County Vocational	10.2	25.3	14.2
Regional	13.2	20.8	16.5
Urban - 31	14.3	20.6	17.3

Although there were wide variations in staffing patterns of educational services personnel, these data indicated that secondary districts, districts with more than 3,000 students, low wealth districts, urban districts, and county vocational districts serve proportionately more students per educational services staff member.

Specific conclusions regarding non-certificated personnel staffing patterns cannot be developed in this report because of inconsistencies in data reporting by local districts. Several districts did not report staff in these categories. This caused the data to be highly skewed and of questionable validity. While these data inconsistencies had no effect on the certificated staff data and conclusions, it is important that more precise standards

for personnel reporting by local districts be adopted.

The three-year trend in staffing by county for administrators and instructors indicated that the largest percent of change occurred in the student to instructor ratio. This ratio declined in every county throughout the State. Indications are that staff reductions-in-force did not keep pace with the state-wide student enrollment decline.

The experiences of other states in coping with declining enrollment indicates that staff reductions cannot occur at the same time and rate as enrollment declines. For example, the Education Commission of the States reported the following staffing problems encountered by declining enrollment districts:

An overall district loss of several hundred students does not automatically decrease the number of teachers needed, particularly when the loss is distributed across the district with only one or two students fewer per classroom....The need for support personnel - secretarial and custodial services - remains the same.... It costs just as much to heat a building half full as it does full.³¹

While it is essential that local districts make necessary staff reductions in response to enrollment decline to ensure a reasonable level of cost efficiency, it may take districts several years to regain an appropriate balance between staff and student needs as overall enrollment decline continues.

The three-year trend in the instructors to administrator ratio experienced the second greatest percent of change. This ratio increased in all but four counties. This indicates that reductions-

³¹ Divorky, Diane. "Burden of the Seventies: The Management of Decline." Phi Delta Kappan, Vol. 61, No. 2, (October 1979), p. 87.

in-force engendered by declining enrollment have probably been felt more acutely at the administrative level than other staff categories.

Although the students to administrator ratio fluctuated, an overall decline occurred in 14 of the 21 counties during the three-year period.

Finally, it appears that districts with special student populations and unique needs are relatively more complex than other districts and should require greater than average staff support if they are to provide a thorough and efficient education. Overall, urban districts, low wealth districts, large districts (more than 3,000 students) and regional districts tended to have the majority of students with these greater than average staff support needs. Data from this report indicated that these districts and their students are currently receiving substantially less than average staff support and may be understaffed.

In contrast, county vocational districts, high wealth districts, suburban districts, and smaller districts (less than 3,000 students) had consistently greater than average staff support ratios. Without established staff ratio standards, it is inappropriate to contend that these districts employ excess staff. However, because these districts appear to be relatively less complex in terms of student needs and district organization, it is reasonable to suspect some overstaffing within these types of districts.

A case-by-case review of all districts and particularly those at the high and low ratio extremes will reveal specific

areas of under- and overstaffing.

It is, therefore, essential that the State Board of Education establish appropriate staffing ratio ranges that will result in the delivery of more equitable and efficient programs and services to New Jersey students.

C. Recommendations

1. Administrative code specifying New Jersey school and district staffing ratio ranges should be developed, adopted and incorporated into the T & E monitoring, classification and budget approval processes. This code should be based on the guidelines on recommended ratios in the preceding section and the district complexity factors discussed in this report.
2. Staffing guidelines should be used as one of the criteria for decisions on school district regionalization, deregionalization and consolidation.
3. In keeping with NJAC 6:11-3.6, Assignment of Titles, only job titles recognized in the New Jersey Administrative Code should be assigned to LEA teaching staff members. Exceptions should rarely be made and only under extraordinary circumstances.
4. A manual of sample job descriptions and guidelines should be provided to assist local school districts in developing job descriptions and assigning recognized job titles to teaching staff members.

5. In an effort to assist districts in accurately reporting their staffing data, it is recommended that uniform definitions for reporting certificated staff assignments be adopted. Therefore, the State Board of Examiners should adopt and recommend to the State Board of Education administrative code rules and regulations that specify authorizations for each administrative, educational services and instructional certificate. To implement this recommendation the Board of Examiners should:
- a. review the existing authorizations in administrative code;
 - b. develop authorizations for those certificate endorsements that do not currently have authorizations in administrative code;
 - c. recommend authorization changes and additions to the State Board of Education for inclusion in the New Jersey Administrative Code.
6. A request for a direct appropriation from the state legislature should be made to expand the pilot study currently underway in Burlington, Cape May, Cumberland, Essex, Gloucester, Middlesex and Salem counties. This will enable the department to maintain computerized Fall Report data on certification and job assignments and to process applications for certification more efficiently. Implementation cost is estimated at \$135,000.

7. Since this study represents the first major effort in compiling information describing current staffing patterns and practices in New Jersey districts, it is necessary to recommend that this report form the basis for a broader follow-up study to determine:
 - a. the extent to which individual district complexity factors affect staffing and the quality of education delivered in local districts.
 - b. the relationship between district staffing practices and pupil achievement as measured by district and school success levels on the State Minimum Basic Skills Test.
 - c. the levels at which staffing practices are minimal, optimal or dysfunctional in terms of cost efficiency and pupil achievement. Case studies of staffing practices in large districts, urban districts, high wealth districts, regional districts and vocational districts should be conducted to form the basis for future policy decisions on staffing.
8. The computer file of staffing data generated for this study should be updated annually and used for future longitudinal studies.

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APPENDIX A
Categories of Certificated Titles

Administrative Personnel Codes

<u>Code</u>	<u>Title</u>
0102	District Superintendent
0103	Vocational-Technical Administrator
0104	Assistant Director Vocational School System
0105	Assistant Superintendent
0107	Assistant Superintendent in charge in Business
0109	School Business Administrator
0130	Executive Superintendent
0131	Assistant Executive Superintendent
0132	Assistant Executive Superintendent Business Administration
0201	High School Principal-more than 12 teachers
0202	High School Vice Principal or Assistant Principal
0204	High School Principal-12 or less teachers
0210	Jr. High School Principal-more than 12 teachers
0211	Jr. High School Vice Principal or Asst. Principal
0213	Jr. High School Principal-12 or less teachers
0301	Vocational School Principal-Director
0302	Vocational School Vice Principal or Asst. Principal
0401	Elementary School Principal-more than 12 teachers
0402	Elementary School Vice Principal or Assistant Elementary School Principal
0403	Teaching Principal
0404	Elementary Principal-12 or less teachers
0406	Middle School Principal
0407	Middle School Vice Principal or Assistant Middle School Principal

Educational Services Personnel Codes

<u>Code</u>	<u>Title</u>
0601	Director of Guidance and/or Student Personnel Services
0602	Supervisor of Guidance and/or Student Personnel Serv.
0603	Director of Athletics
0605	Director of Audio-Visual Aids
0802	Coordinator of Audio-Visual Aids
0803	Coordinator of Guidance
2701	Student Personnel Services
2710	Guidance (less than half-time)
2720	Teacher Counselor (half time or more, but not full time)
2730	Counselor (full-time)
2740	Vocational Counselor
2810	Teacher Librarian
2820	School Librarian
2840	Associate Educational Media Specialist
2850	Educational Media Specialist
2910	Occupational Therapist
2920	Physical Therapist
3000	School Nurse
3100	School Psychologist
3200	Visiting Teacher (School Social Worker)
3300	Learning Disabilities Teacher - Consultant
3400	Speech Pathologist
3500	Remedial Instructor
4090	Other Education Services Positions and Assignments (Specify)

Supervisors/Coordinators

<u>Code</u>	<u>Title</u>
0106	Supervisor (General)
0205	General Secondary Supervisor
0405	General Elementary Supervisor
0502	Assistant Subject Supervisor (Specify Subject)
0503	Supervisor of Curriculum and/or Instruction
0512	Art
0513	Business
0514	English
0515	Foreign Languages
0516	Physical Education or Health
0517	Home Economics
0518	Industrial Arts
0519	Math
0521	Music
0522	Science
0523	Social Studies
0524	Special Education
0525	Vocational-Technical
0526	Vocational-Technical Subjects
0527	Other (Specify)
0604	Director of Curriculum and/or Instruction
0606	Subject Director (Specify subject)
0701	School Nurse Supervisor
0801	Coordinator of Curriculum and/or Instruction

Instructional Personnel

<u>Code</u>	<u>Title</u>
0305	Coordinator of Apprentice Programs
0804	Subject Coordinator
1000	Nursery School Teacher
1001	Elementary Grade 1
1002	Elementary Grade 2
1003	Elementary Grade 3
1004	Elementary Grade 4
1005	Elementary Grade 5
1006	Elementary Grade 6
1007	Elementary Grade 7
1008	Elementary Grade 8
1010	Kindergarten Teacher
1011	Elementary (Pre-First)
1012	Elementary Ungraded Teacher
1090	Other Elementary Teaching Position (Specify)
1100	Elementary (Substitute)
1101	Secondary (Substitute)
1200	Art, Elementary K-6
1201	Art, Elementary Grades 7-8
1203	Art Fundamentals, Basic Art, Art I
1204	Art Advanced (Art II, III, IV)
1210	Crafts
1211	Commercial Art
1212	Graphic Arts
1213	Photography
1220	Art Appreciation
1221	Art History
1230	Related Arts or Unified Arts
1240	Fine Art (Painting and Sculpture)
1241	Ceramics and/or Sculpture
1299	Other Art (Specify)
1310	General Business
1311	Business English

Instructional Personnel (continued)

<u>Code</u>	<u>Title</u>
1312	Business Arithmetic
1313	Business Law
1314	Economic Geography
1315	Economics
1316	Consumer Economics (Education)
1317	Business Management
1318	Business Organization
1320	Bookkeeping, Personal
1321	Personal Typing
1330	Salesmanship
1331	Advertising
1332	Marketing
1333	Retailing
1334	Merchandising
1340	Record Keeping
1341	Business Machines
1342	Bookkeeping I
1343	Bookkeeping II
1344	Bookkeeping III
1345	Accounting
1346	Advanced Business Training
1350	Typing I
1352	Typing II
1353	Shorthand I
1354	Shorthand II
1355	Machine Shorthand
1356	Transcription
1357	Key punch Operation
1358	Data Processing
1360	Clerical Practice
1361	Secretarial Practice
1362	Office Practice
1370	Cooperative Office Education

Instructional Personnel (continued)

<u>Code</u>	<u>Title</u>
1399	Other Business Courses (Specify)
1411	English Grades 7-8
1412	English I
1413	English II
1414	English III
1415	English IV
1420	Library Studies
1430	Reading Improvement, Elementary Grades 1-6
1431	Reading Improvement, Grades 7-8
1432	Reading Improvement
1440	Speech (Arts and Dramatics)
1441	Public Speaking
1445	Dramatics
1450	Speech
1460	Creative Writing
1465	Journalism
1470	World Literature
1475	English as a Second Language
1480	Bilingual/Bicultural Education
1490	Other English or Language Arts (Specify)
1511	French, Grades 7-8
1512	French I
1513	French II
1514	French III
1515	French IV
1521	German, Grades 7-8
1522	German I
1523	German II
1524	German III
1525	German IV
1531	Italian, Grades 7-8
1532	Italian I
1533	Italian II

Instructional Personnel (continued)

<u>Code</u>	<u>Title</u>
1534	Italian III
1535	Italian IV
1541	Latin, Grades 7-8
1542	Latin I
1543	Latin II
1544	Latin III
1545	Latin IV
1551	Spanish, Grades 7-8
1552	Spanish I
1553	Spanish II
1554	Spanish III
1555	Spanish IV
1561	Russian, Grades 7-8
1562	Russian I
1563	Russian II
1564	Russian III
1565	Russian IV
1570	Greek
1572	Chinese
1573	Japanese
1578	Hebrew
1574	Portuguese
1576	Polish
1590	Other Foreign Languages (Specify)
1600	Health and Physical Education, Elementary Grades K-6
1607	Health and Physical Education, Elementary Grades 7-8
1610	Driver Education (Behind-the-Wheel)
1611	Driver Education (Theory only)
1620	Health Education
1630	Physical Education
1633	Health and Physical Education
1640	First Aid
1650	Home Nursing

Instructional Personnel (continued)

<u>Code</u>	<u>Title</u>
1680	Recreation
1690	Other Health, Safety or Physical Education (Specify)
1700	Home Economics, Elementary Grades K-6
1707	Home Economics, Elementary Grades 7-8
1709	Home Economics
1710	Clothing
1720	Foods
1730	Child Care
1740	Housing and Equipment
1741	Home Furnishings and Decorations
1750	Personal and Family Relationships
1751	Family Life Education
1760	Occupational Home Economics (Specify)
1790	Cooperative Home Economics
1799	Other Home Economics (Specify)
1800	Industrial Arts, Elementary Grades K-6
1811	General Shop, Grades 7-8
1812	General Shop
1814	Plastics, Grades 7-8
1815	Plastics
1817	Ceramics, Grades 7-8
1818	Ceramics
1820	Mechanical Drawing, Grades 7-8
1821	Mechanical Drawing
1822	Architectural Drawing
1823	Machine Drawing
1824	Architecture and Home Planning
1825	Engineering Drawing
1827	Industrial Arts Drawing, Grades 7-8
1828	Industrial Arts Drawing
1830	General Woodwork, Grades 7-8
1832	General Woodwork

Instructional Personnel (continued)

<u>Code</u>	<u>Title</u>
1840	General Metalwork, Grades 7-8
1842	General Metalwork
1844	Machine Shop
1846	Art Metal, Grades 7-8
1848	Art Metal
1850	Radio and Theory
1851	Basic Electricity, Grades 7-8
1853	Basic Electricity
1860	General Mechanics, Grades 7-8
1861	General Mechnics
1862	Power Mechanics
1864	Auto Mechanics
1870	Graphic Arts, Grades 7-8
1872	Graphic Arts
1874	Printing, Grades 7-8
1876	Printing
1880	Home Mechanics, Grades 7-8
1882	Home Mechanics
1890	Industrial Arts Mathematics
1891	Applied Mathematics
1892	Shop Mathematics
1893	Surveying
1899	Other Industrial Arts (Specify)
1910	Arithmetic
1919	General Mathematics I
1920	General Mathematics II
1921	Math, Grades 7-8
1923	Business Math
1924	Shop Math
1930	Algebra I
1931	Algebra II
1932	Advanced Algebra

Instructional Personnel (continued)

<u>Code</u>	<u>Title</u>
1933	Algebra and Trigonometry
1940	Geometry
1950	Trigonometry
1960	Analytical Geometry and Calculus
1970	Probability and Statistics
1990	Other Mathematics (Specify)
2100	Music, Comprehensive, Elementary Grades K-6
2101	Music, Comprehensive, Grades 7-8
2105	Music, Comprehensive
2106	Music, Instrumental, Elementary Grades K-6
2107	Music, Instrumental, Grades 7-8
2110	Music, Instrumental
2111	Band
2112	Orchestra
2120	Music, Vocal
2121	Glee Club
2122	Choir
2130	Music Appreciation
2140	Music, Harmony (Theory)
2150	Music, History
2190	Other Music (Specify)
2210	Biology
2211	Biological Science
2212	Advanced Biology (Twelfth Year)
2213	Botany
2214	Applied Biology
2219	Zoology
2220	Earth Science
2231	General Science, Grades 7-8
2232	General Science
2233	General Science, Advanced
2240	Physical Science

Instructional Personnel (continued)

<u>Code</u>	<u>Title</u>
2241	Chemistry
2243	Advanced Science (Physics)
2244	Advanced Chemistry
2245	Electronics
2246	Applied Chemistry
2247	Physics
2248	Astronomy
2249	Applied Physics
2250	Military Science
2290	Other Sciences (Specify)
2301	Social Studies, Grades 7-8
2311	Geography, Grades 7-8
2312	Geography, Commercial or Economic
2313	World Geography
2321	U.S. History, Grades 7-8
2322	U.S. History I
2323	U.S. History II
2324	Ancient History
2325	Modern History
2326	World History
2327	Early European History
2328	Latin American History
2329	New Jersey History
2330	Economics
2331	Civics (or Government)
2332	International Relations
2335	Non-Western Studies
2336	African Studies, History
2337	Asian Studies, History
2338	World Cultures
2340	Modern Living
2341	Human Relations
2344	Sociology
2350	Group Guidance

Instructional Personnel (continued)

<u>Code</u>	<u>Title</u>
2351	Occupations (Vocations)
2352	Vocational Guidance
2360	Psychology
2370	Humanities
2390	Other Social Studies (Specify)
2410	Visually Handicapped (Blind or Partially Sighted)
2420	Auditorily Handicapped (Deaf and/or Hard of Hearing)
2433	Educable Mentally Retarded
2434	Trainable Mentally Retarded
2440	Orthopedically Handicapped (Physically Limited)
2450	Socially and Emotionally Maladjusted
2451	Emotionally Disturbed
2452	Socially Maladjusted
2470	Teacher of the Handicapped
2471	Communication Handicapped
2472	Neurologically or Perceptually Impaired
2473	Chronically Ill
2475	Multiply Handicapped
2490	Other Special Education or Handicapped (Specify)
2501	Agricultural Science
2510	Related Art
2513	Related Color and Design
2520	Related Mathematics
2526	Related Drawing and Blueprint Reading
2540	Related Science
2572	Coordinator of Cooperative Industrial Education
2599	Other Vocational-Technical Related Subjects
2601	Agricultural Production
2602	Agricultural Supplies/Services
2603	Agricultural Mechanics
2604	Agricultural Products
2605	Ornamental Horticulture
2606	Livestock Production
2607	Agricultural Resources

Instructional Personnel (continued)

<u>Code</u>	<u>Title</u>
2608	Forestry
2609	Other Agricultural Occupations (Specify)
2610	Distributive Occupations (Prep.)
2611	Distributive Occupations (Coop.)
2619	Other Distributive Occupations (Specify)
2621	Dental Assistant
2622	Medical Assistant
2623	Practical Nursing
2629	Other Health Occupations (Specify)
2631	Architectural Technology (Architectural Drafting)
2632	Automotive Technology
2633	Chemical Technology
2634	Civil Technology
2635	Electrical Technology
2636	Electronic Technology
2637	Electromechanical Technology
2638	Environmental Control Technology
2639	Instrumentation Technology
2640	Mechanical Technology
2641	Metallurgical Technology
2642	Scientific Data Technology
2643	Drafting and Design Technology
2644	General Laboratory Technology
2645	Agricultural and Forestry Technology
2646	Water and Waste Water Technology
2649	Other Technical Occupations (Specify)
2651	Air Conditioning, Heating and Refrigeration
2652	Appliance Repair
2653	Body and Fender Repair
2654	Auto Mechanics
2655	Aviation Occupations (Aircraft Maintenance)
2656	Business Machine Maintenance and Repair
2657	Commercial Art Occupations

Instructional Personnel (continued)

<u>Code</u>	<u>Title</u>
2658	Commercial Photography Occupations
2659	Carpentry
2660	Cabinet Making
2661	Masonry
2662	Painting and Decorating
2663	Plumbing and Pipefitting
2664	Building Trades
2665	Custodial Service (Building Maintenance)
2667	Diesel Mechanic
2668	Draftsman
2669	Electrical Occupations
2670	Electronics Occuaptions (Radio and T.V.)
2671	Fabric Maintenance Services
2672	Printing Occupations
2673	Instrument Maintenance and Repair
2674	Maritime Occupations
2675	Machine Shop
2676	Sheet Metal Worker
2677	Welding Occupations
2678	Barbering
2679	Cosmetology
2680	Plastic Occupations
2681	Quantity Food Occupations
2682	Small Engine Repair
2683	Stationary Engineer
2684	Textile Production and Fabrication
2685	Upholstering
2690	Cooperative Work Experience Programs (T & I)
2699	Other Trades, Production or Service Occupations (Specify)
2460	Speech Correction
2573	Teacher-Coordinator of Cooperative Vocational- Technical Education Program: Agricultural Education
2574	Teacher-Coordinator of Cooperative Vocational- Technical Education Program: Distributive Education

Instructional Personnel (continued)

<u>Code</u>	<u>Title</u>
2575	Teacher-Coordinator of Cooperative Vocational- Technical Education Program: Health Occupations
2576	Teacher-Coordinator of Cooperative Vocational- Technical Education Program: Home Economics
2577	Teacher-Coordinator of Cooperative Vocational- Technical Education Program: Business Education
2578	Teacher-Coordinator of Cooperative Vocational- Technical Education Program: WECEP

APPENDIX B

Non-Certificated Staff

Non-Certificated Staff

STUDENTS/FOOD SERVICES PERSONNEL

by Organization Type

Districts	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
K-6	71	84.77	142.41	1.68	4.47
K-8	232	161.51	690.29	4.27	13.31
K-12	210	456.21	1152.37	2.53	5.23
9-12	32	271.73	437.91	1.61	2.34
7-12	16	96.15	123.50	1.28	2.22
County Vocational	20	239.93	441.04	1.83	2.48

STUDENTS/FOOD SERVICES PERSONNEL

by Wealth

Wealth	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
Low	190	322.97	1087.36	3.37	6.73
Medium	196	233.81	456.67	1.95	3.34
High	196	243.71	868.03	3.56	8.64

STUDENTS/FOOD SERVICES PERSONNEL

by Community Type

Community Type	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
Urban	155	495.27	1300.32	2.63	4.81
Suburban	202	211.30	776.34	3.67	10.83
Rural	155	111.07	142.25	1.28	3.17
Regional	50	257.24	475.49	1.85	2.52
County Vocational	20	239.93	441.04	1.83	2.48

STUDENTS/OPERATIONAL PLANT PERSONNEL

by Organization Type

Districts	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
K-6	71	96.14	96.63	1.03	1.12
K-8	232	139.74	146.97	1.05	4.18
K-12	210	193.40	347.70	1.80	8.24
9-12	32	198.38	245.29	1.24	3.69
7-12	16	103.08	68.98	.67	-.55
County Vocational	20	146.59	327.74	2.23	4.36

STUDENTS/OPERATIONAL PLANT PERSONNEL

by Wealth

Wealth	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
Low	190	177.03	221.99	1.25	4.68
Medium	196	126.81	97.70	.77	2.65
High	196	164.61	352.14	2.14	8.37

STUDENTS/OPERATIONAL PLANT PERSONNEL

by Community Type

Community Type	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
Urban	155	164.75	230.10	1.40	4.98
Suburban	202	166.30	312.03	1.88	10.78
Rural	155	134.08	155.82	1.16	3.98
Regional	50	156.89	203.01	1.29	4.55
County Vocational	20	146.59	327.74	2.23	4.36

STUDENTS/MAINTENANCE PERSONNEL

by Organization Type

Districts	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
K-6	71	131.34	329.27	2.51	5.04
K-8	232	263.72	455.22	1.73	3.34
K-12	210	553.61	720.23	1.30	4.99
9-12	32	526.39	517.62	.98	.87
7-12	16	550.38	524.91	.95	1.32
County Vocational	20	313.10	516.13	1.65	1.85

STUDENTS/MAINTENANCE PERSONNEL

by Wealth

Wealth	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
Low	190	433.13	651.74	1.50	4.61
Medium	196	402.53	616.45	1.53	4.89
High	196	299.75	445.74	1.49	2.93

STUDENTS/MAINTENANCE PERSONNEL

by Community Type

Community Type	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
Urban	155	447.46	505.08	1.13	2.91
Suburban	202	401.80	595.76	1.48	4.65
Rural	155	227.02	632.36	2.79	6.92
Regional	50	534.19	515.19	.96	.91
County Vocational	20	313.10	516.13	1.65	1.85

STUDENTS/INSTRUCTIONAL AIDES

by Organization Type

Districts	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences $\left(\frac{SD}{Mean}\right)$	Skewness
K-6	71	78.62	114.68	1.46	1.61
K-8	232	153.86	349.88	2.27	5.56
K-12	210	486.59	1020.20	2.10	5.53
9-12	32	221.24	461.03	2.08	2.3
7-12	16	208.45	361.54	1.73	1.84
County Vocational	20	160.28	285.09	1.79	1.46

STUDENTS/INSTRUCTIONAL AIDES

by Wealth

Wealth	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences $\left(\frac{SD}{Mean}\right)$	Skewness
Low	190	308.06	857.67	2.78	8.74
Medium	196	313.27	695.02	2.22	4.56
High	196	192.31	438.56	2.28	3.76

STUDENTS/INSTRUCTIONAL AIDES

by Community Type

Community Type	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences $\left(\frac{SD}{Mean}\right)$	Skewness
Urban	155	319.96	725.39	2.27	4.61
Suburban	202	347.54	910.17	2.62	7.18
Rural	155	419.44	273.32	1.83	3.61
Regional	50	220.07	404.07	1.84	2.30
County Vocational	20	160.28	285.09	1.79	1.46

INSTRUCTORS/INSTRUCTIONAL AIDES

by Organization Type

Districts	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences $\left(\frac{SD}{Mean}\right)$	Skewness
K-6	71	4.82	7.16	1.49	1.77
K-8	232	9.45	20.43	2.16	4.74
K-12	210	29.24	59.36	2.03	5.09
9-12	32	13.64	28.66	2.10	2.41
7-12	16	12.21	20.85	1.71	1.77
County Vocational	20	10.64	17.96	1.69	1.42

INSTRUCTORS/INSTRUCTIONAL AIDES

by Wealth

Wealth	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences $\left(\frac{SD}{Mean}\right)$	Skewness
Low	190	18.00	48.13	2.73	8.32
Medium	196	18.97	41.69	2.20	4.72
High	196	12.32	27.61	2.24	3.74

INSTRUCTORS/INSTRUCTIONAL AIDES

by Community Type

Community Type	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences $\left(\frac{SD}{Mean}\right)$	Skewness
Urban	155	19.69	44.41	2.26	4.67
Suburban	202	20.82	51.68	2.48	6.65
Rural	155	8.89	16.79	1.78	3.52
Regional	50	13.58	25.09	1.85	2.36
County Vocational	20	10.64	17.96	1.69	1.42

STUDENTS/TRANSPORTATION PERSONNEL

by Organization Type

Districts	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
K-6	71	44.18	138.64	3.14	5.71
K-8	232	165.48	727.40	4.40	11.54
K-12	210	872.52	1628.67	1.87	3.66
9-12	32	315.73	744.12	2.36	3.02
7-12	16	214.77	446.40	2.08	3.36
County Vocational	20	472.03	1300.86	2.69	2.45

STUDENTS/TRANSPORTATION PERSONNEL

by Wealth

Wealth	Districts (Valid. N)	Average (Mean)	Standard Deviation	Relative Size of the differences (SD) (Mean)	Skewness
Low	190	394.67	939.46	2.38	3.84
Medium	196	417.31	1234.05	2.96	6.81
High	196	481.25	1305.05	2.71	4.61